the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

Hampton Roads 2045 Long-Range Transportation Plan: Transportation Challenges and Strategies

T20-15

October 2020

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REPORT DOCUMENTATION

TITLE
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ABSTRACT
This document – part of the compendium of reports that comprise the 2045 Hampton Roads Long-Range Transportation Plan (LRTP) – summarizes challenges related to the transportation system and strategies that are planned or in place to help address these challenges.

ACKNOWLEDGMENT & DISCLAIMERS
Prepared in cooperation with the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), and Virginia Department of Transportation (VDOT). The contents of this report reflect the views of the Hampton Roads Transportation Planning Organization (HRTPO). The HRTPO is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, VDOT, or Hampton Roads Planning District Commission. This report does not constitute a standard, specification, or regulation. FHWA or VDOT acceptance of this report as evidence of the fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements, nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project-level environmental impact assessments and/or studies of alternatives may be necessary.

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HAMPTON ROADS 2045 LONG-RANGE TRANSPORTATION PLAN: TRANSPORTATION CHALLENGES AND STRATEGIES

REPORT DATE OCTOBER 2020

REPORT T20-15

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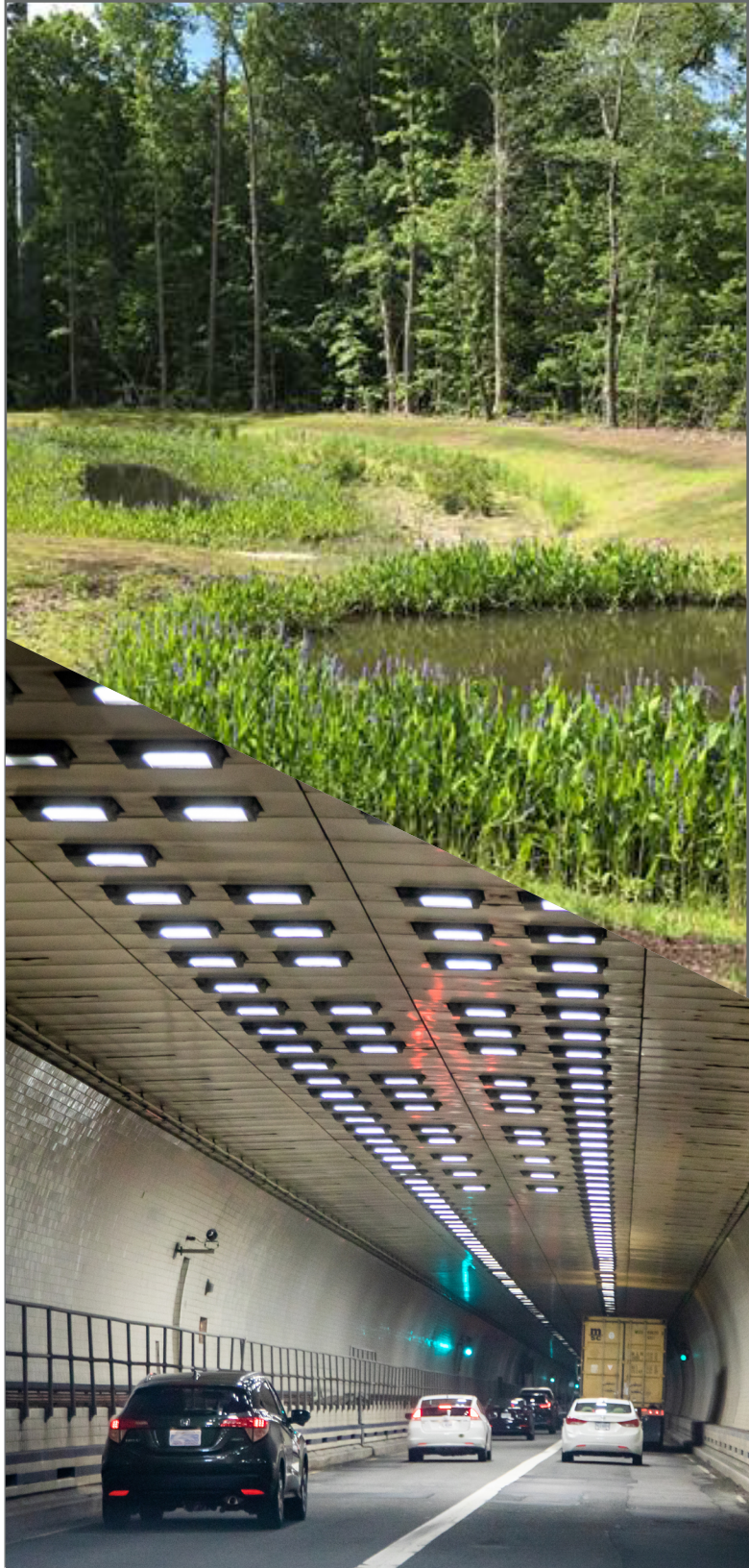

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CHAPTER 1: INTRODUCTION

The Hampton Roads transportation network is comprised of an intricate system of roads, bridges, tunnels, bikeways, trails, railroads, and waterways. These facilities are traveled by buses, trucks, ferries, trains, pedestrians, cyclists, and hundreds of thousands of drivers in personal vehicles each day. Providing for the efficient movement of 1.7 million residents and thousands of visitors in the region presents a multitude of challenges, particularly given the unique geographic features of Hampton Roads.

This document – part of the compendium of reports that comprise the 2045 Hampton Roads Long-Range Transportation Plan (LRTP) – summarizes challenges related to the transportation system and strategies that are planned or in place to help address these challenges.

This report is organized into six categories. **Mobility and Accessibility** addresses the challenges and strategies related to traveling from point A to point B. **Cornerstones of the Regional Economy** discusses issues facing the military, the movement of freight, and tourism. **System Preservation, Safety, and Security** details the condition and preservation of transportation infrastructure, including the protection of residents and visitors to the region. **The Environment** chapter explores topics such as maintaining water and air quality, protecting sensitive areas, and adjusting to the impacts of climate change. **Transportation Finance** details issues related to funding transportation needs. **Performance Management** highlights efforts to monitor and measure system performance.

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CHAPTER 2: MOBILITY AND ACCESSIBILITY

SPECIAL NEEDS POPULATIONS

A regional transportation system is essential in creating quality communities, including reducing problems experienced by underprivileged communities. Mobility and accessibility challenges vary significantly for different users of the regional transportation system. For example, the transportation challenges faced by people with a disability or persons who live in carless households differ drastically from other users of the system. This section explores challenges to mobility and accessibility that multiple disadvantaged population groups within Hampton Roads face, and strategies to address these challenges.

CHALLENGES FOR DISADVANTAGED POPULATIONS

The HRTPO developed a Title VI/Environmental Justice Methodology to help determine potential impacts of transportation projects on disadvantaged populations, also known as Environmental Justice communities. This methodology was applied to candidate projects being considered for the 2045 LRTP, which is documented in the *Hampton Roads 2045 Long-Range Transportation Plan: Title VI/Environmental Justice Candidate Project Evaluation* report (the third in the series of reports documenting the development of the 2045 LRTP).

As part of this methodology, Environmental Justice communities who could potentially experience barriers to mobility are identified and regional averages for each community are calculated. These disadvantaged communities include:

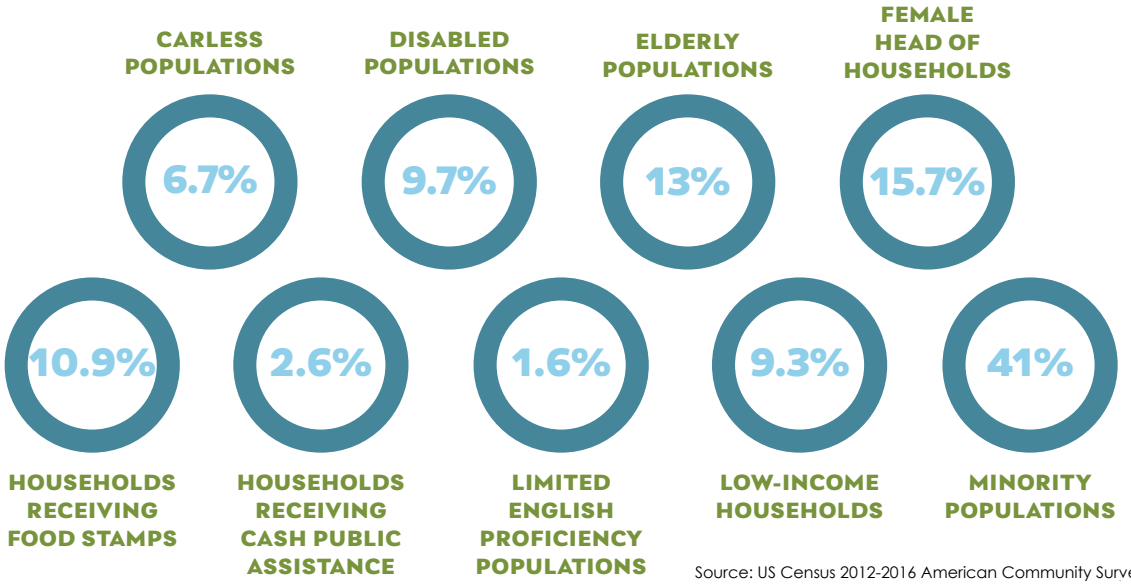


Figure 1: Disadvantaged Communities

Carless Populations

There are individuals in Hampton Roads who do not own an automobile and therefore are reliant on alternative modes of transportation. According to the U.S. Census Bureau, 6.7% percent of households in Hampton Roads are carless.

For some of these individuals, economic distress limits automobile ownership. The cost of owning, insuring, and maintaining an automobile has risen considerably over time; and these costs have placed owning a vehicle out of reach for this segment of the population. Without a car, economically distressed carless people often attempt to reside in neighborhoods with a reasonable level of transit availability.

Some individuals who do not own automobiles do so by choice. Recent travel trends confirm that younger transportation users are more apt to prefer alternative modes of travel over the car. Citing the need to be environmentally, economically, and socially conscious, these individuals prefer walkable, mixed-use activity centers with multi-modal transportation options.

Disabled Populations

The U.S. Census Bureau defines disability as "a long-lasting physical, mental, or emotional condition." Such conditions can make activities such as walking and climbing stairs difficult and may lead to further impediments on daily activities. Traveling to doctor appointments, grocery stores, or social events can prove to be a daunting task for individuals with disability challenges which makes a portion of this population reliant on public transit, paratransit (alternative mode of flexible passenger transportation that does not follow fixed routes or schedules) and non-motorized forms of transportation. This segment of the population faces many of the same accessibility challenges as the elderly. These challenges and limited transportation alternatives can negatively impact the quality of life for people with a disability. According to the U.S. Census Bureau, 9.7% of the Hampton Roads region have households with disabled populations.

Elderly Populations

Between 2012-2016, the U.S. Census Bureau estimates that 13% of the Hampton Roads population is 65 or older, up from 10.21% in 2000 and 11.45% on 2010. This estimate is expected to continue to increase by 2045. Mobility and accessibility challenges for the senior population will continue to emerge as the percentage of older citizens continues to grow. The ability to drive a vehicle as a means to fulfill mobility needs declines as individuals continue to age. Rising medical/functional needs and the reduced desire to drive contribute to a growing portion of the elderly population becoming non-drivers. Though many elderly non-drivers reduce their trips as a result of mobility limitations, it is not a signal of a reduced need for transportation mobility and accessibility. Instead, many seniors become more dependent on other options for transportation, creating an increased demand for mobility and accessibility options.

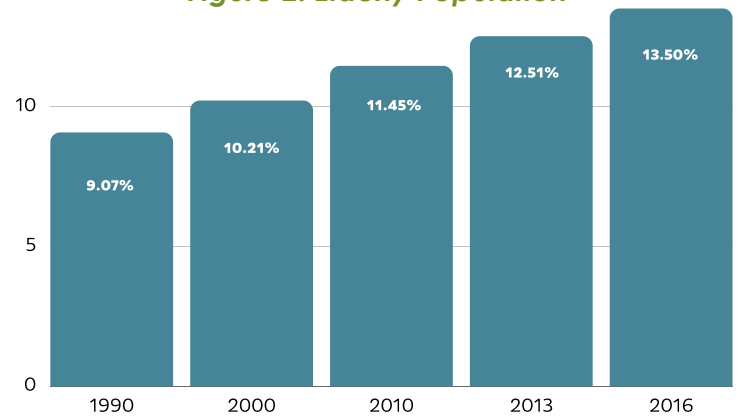
Female Heads of Households

Female Heads of Households are defined as households headed by females with children present and no husband present. Another critical demographic indicator to show because these households are more susceptible to poverty because they have fewer earners providing financial support within the home. For the Hampton Roads region, the U.S. Census Bureau estimates 15.7% of households are headed by females.

Households Receiving Cash Public Assistance or Food Stamps

According to the U.S. Census Bureau, public assistance refers to assistance programs that provide either cash assistance or in-kind benefits to individuals and families from any governmental entity. Two types of public assistance include cash public assistance (Social Security, Department of Vertaran's Affairs benefits, Unemployment insurance compensation, Worker's compensation) and food-related assistance programs. Households and individuals under these programs usually also experience

Figure 2: Elderly Population



Data Source: US Census

limited transportation options. The U.S. Census Bureau estimates 2.6% of households in Hampton Roads receive cash public assistance income, and 10.9% of households receive food stamps.

Limited English Proficiency Households

Limited English proficiency refers to anyone above the age of 5 who reported speaking English less than "very well." The importance of researching and locating these households is to develop and promote transportation services to be more accessible to persons of limited English proficiency households. For the Hampton Roads region, the U.S. Census Bureau estimates that 1.6% of households have limited English proficiency.

Low-Income Households (Below Poverty)

Low-Income Households include persons that are living at or below the Federal Poverty Level. The populations within these communities tend to have fewer options for living locations, and sometimes, these less desirable locations do not have quality transportation alternatives. According to the U.S. Census Bureau, the Hampton Roads region has 9.3% of households below the Federal poverty level.

Minority Populations

According to the U.S. Census Bureau, Minority Populations are defined as several different race categories – Black, American Indian, Asian, Pacific Islander, Other, and Two or More races. Hispanics are also considered a minority, though Hispanic, or Latino, is defined by the US Census as an ethnicity rather than a race. For the Hampton Roads region, the U.S. Census Bureau estimates that 41% of the population is minority.

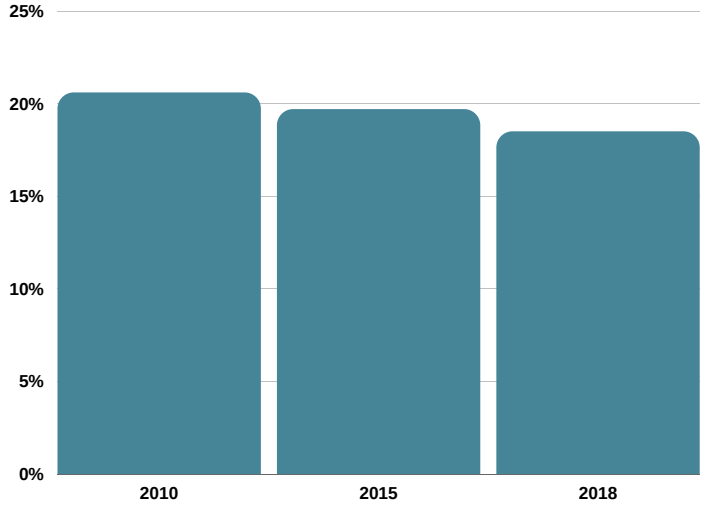
Youth Population

One key age demographic that is not historically focused on in long-range transportation plans and transportation network planning is the youth population (age 0-14). According to the U.S. Census Bureau 2018 American Community Survey 5-Year Estimates, 18.5% of the Hampton Roads Population is 14 and under.

Successfully planning for the transportation needs of the youth in Hampton Roads will impact not only how they travel today (to and from school, the playground, recreational sports, a friend's house) but also influences future transportation related decisions they will make as adults.

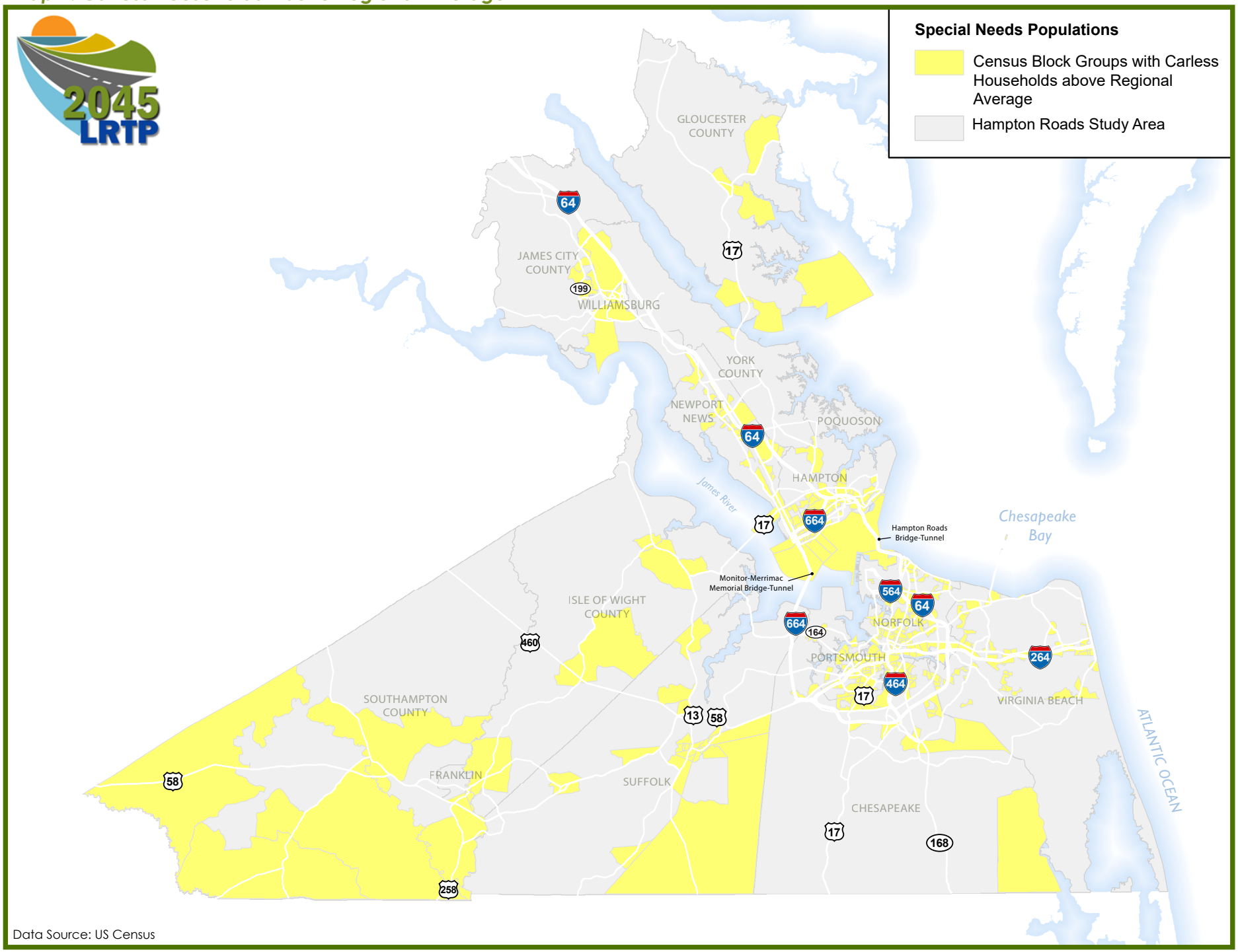
Increased efforts in youth transportation planning have been made at Federal, state, and local levels of government. The Transportation Alternatives Set-Aside program combines the Safe Routes to School program (which strives to "advance safe walking and bicycling to and from schools, and in daily life, to improve the health and well-being of America's children and to foster the creation of livable, sustainable communities") with other transportation alternatives activities including Recreational Trails and "Boulevard" activities (intended to reconnect communities along abandoned interstate right of way by installing new bicycle and pedestrian facilities). These efforts will help facilitate the planning, development, and implementation of projects and activities that improve safety, reduce congestion, fuel consumption, and air pollution.

Figure 3: Youth Population



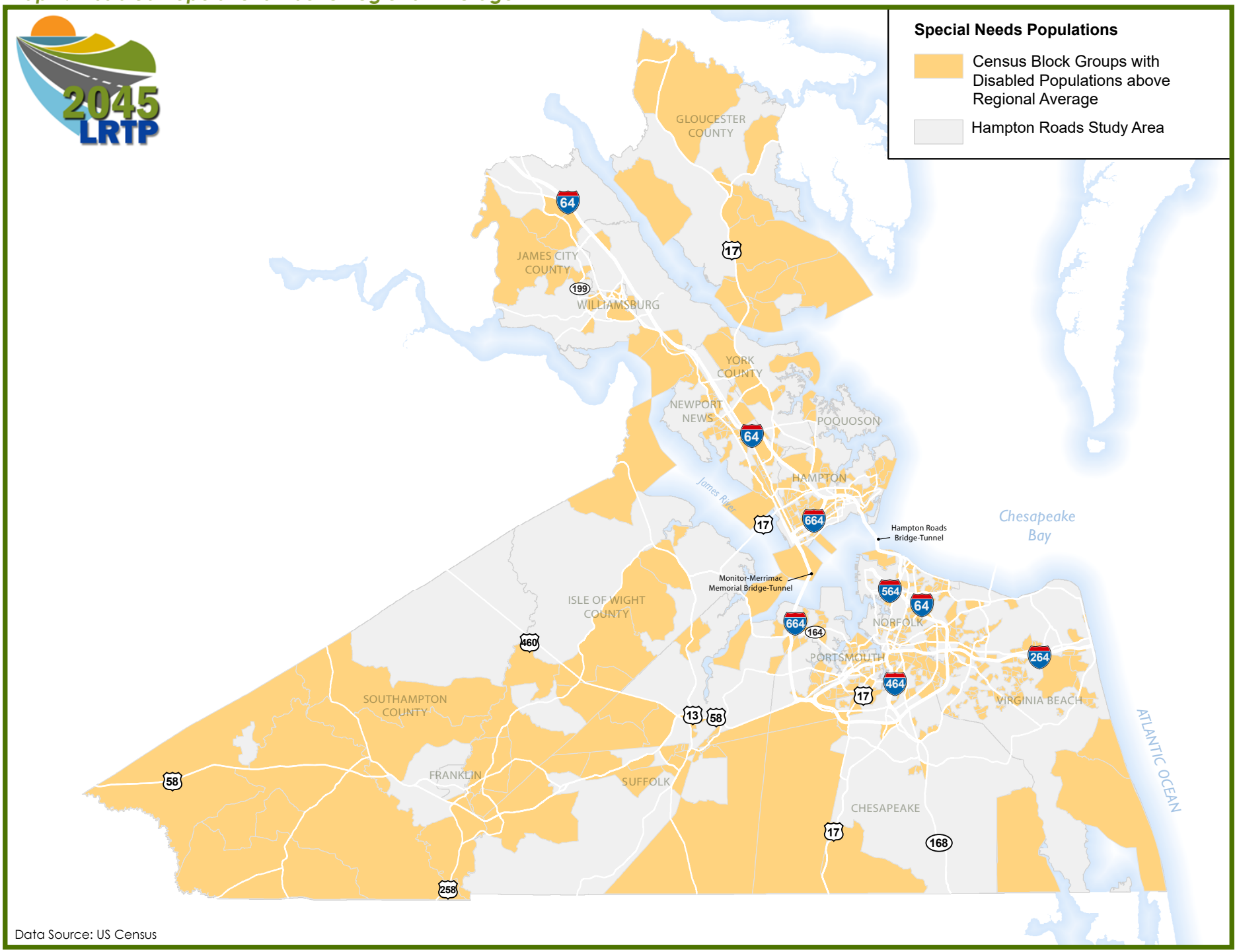
Data Source: US Census

Map 1: Carless Households Above Regional Average



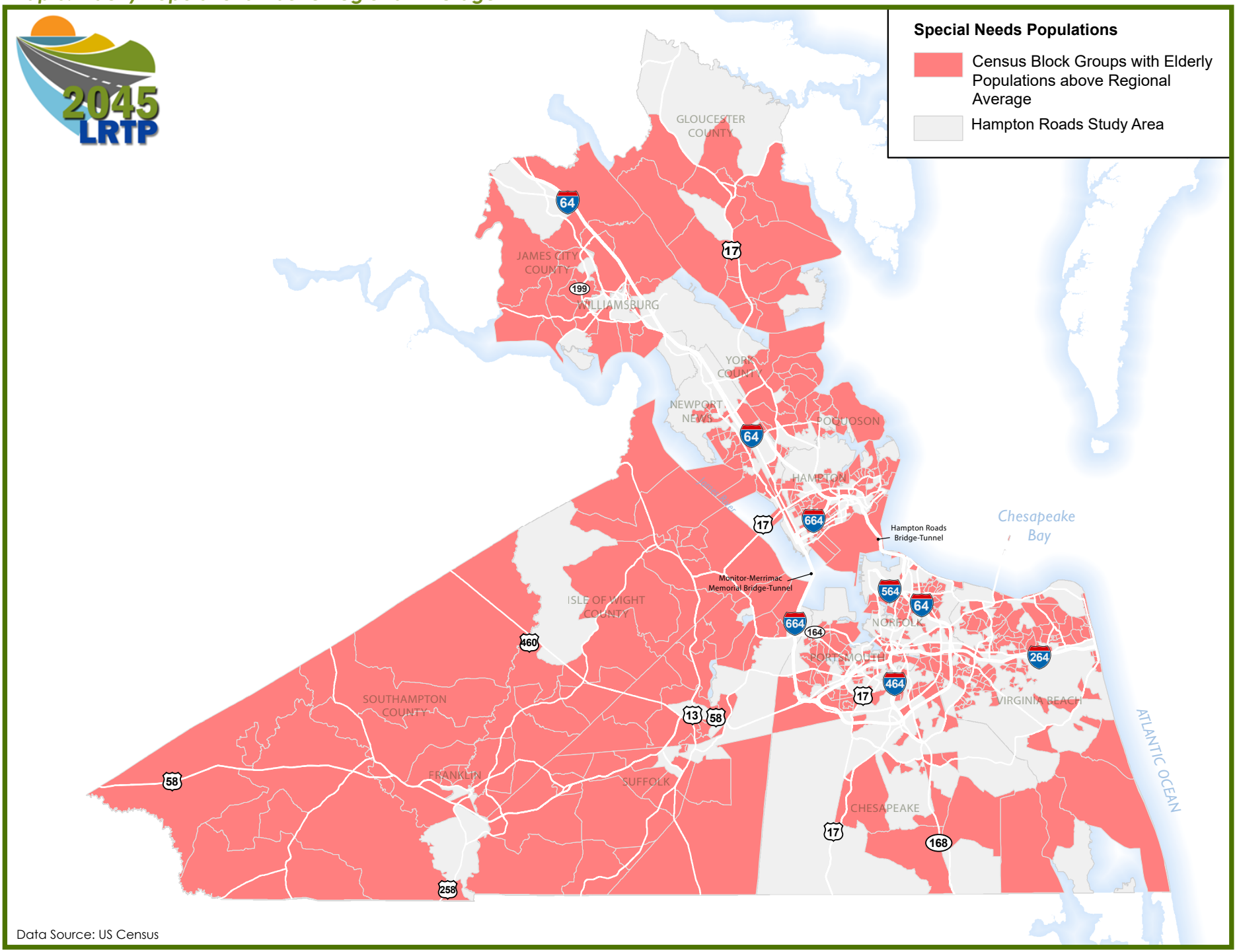
Data Source: US Census

Map 2: Disabled Populations Above Regional Average



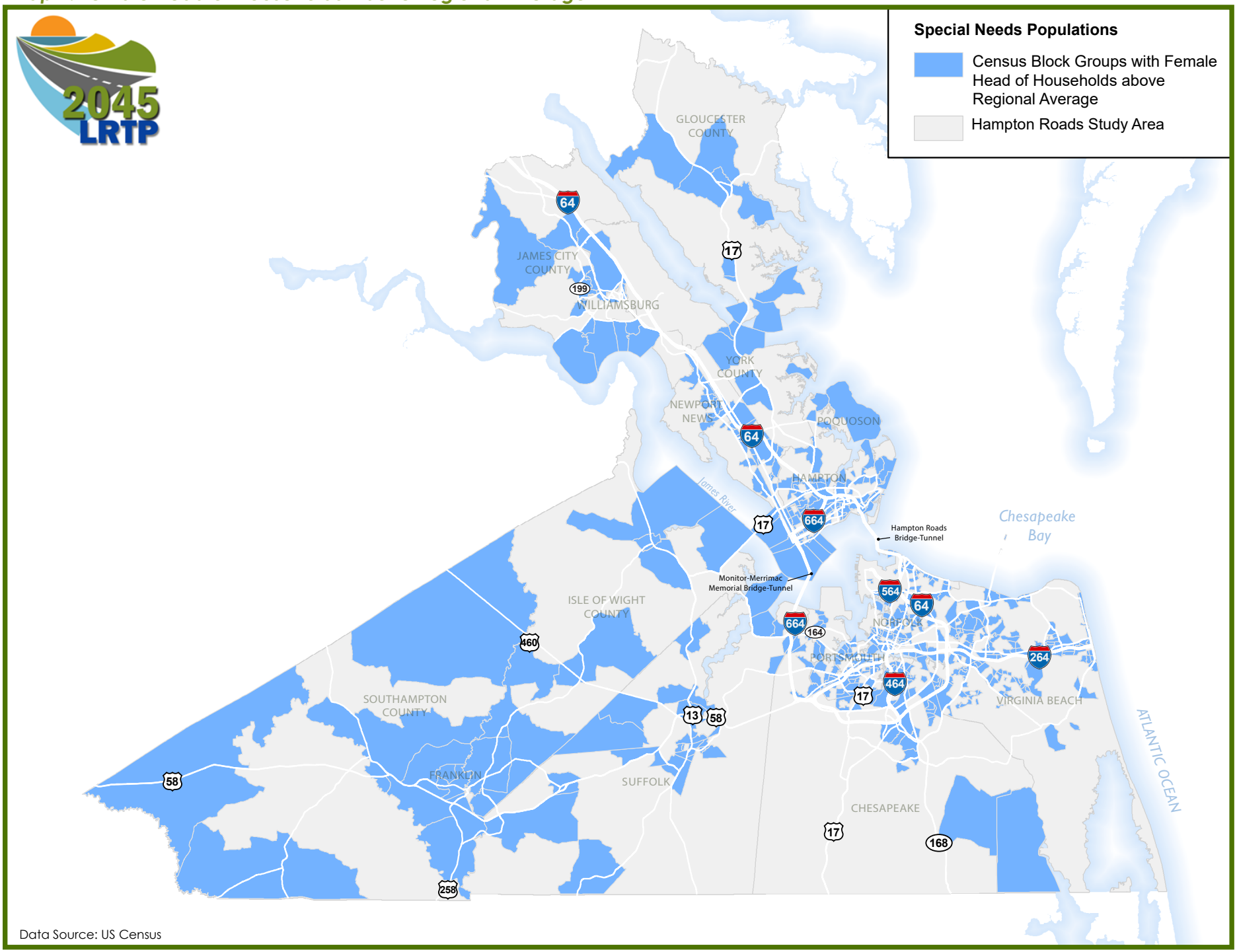
Data Source: US Census

Map 3: Elderly Populations Above Regional Average



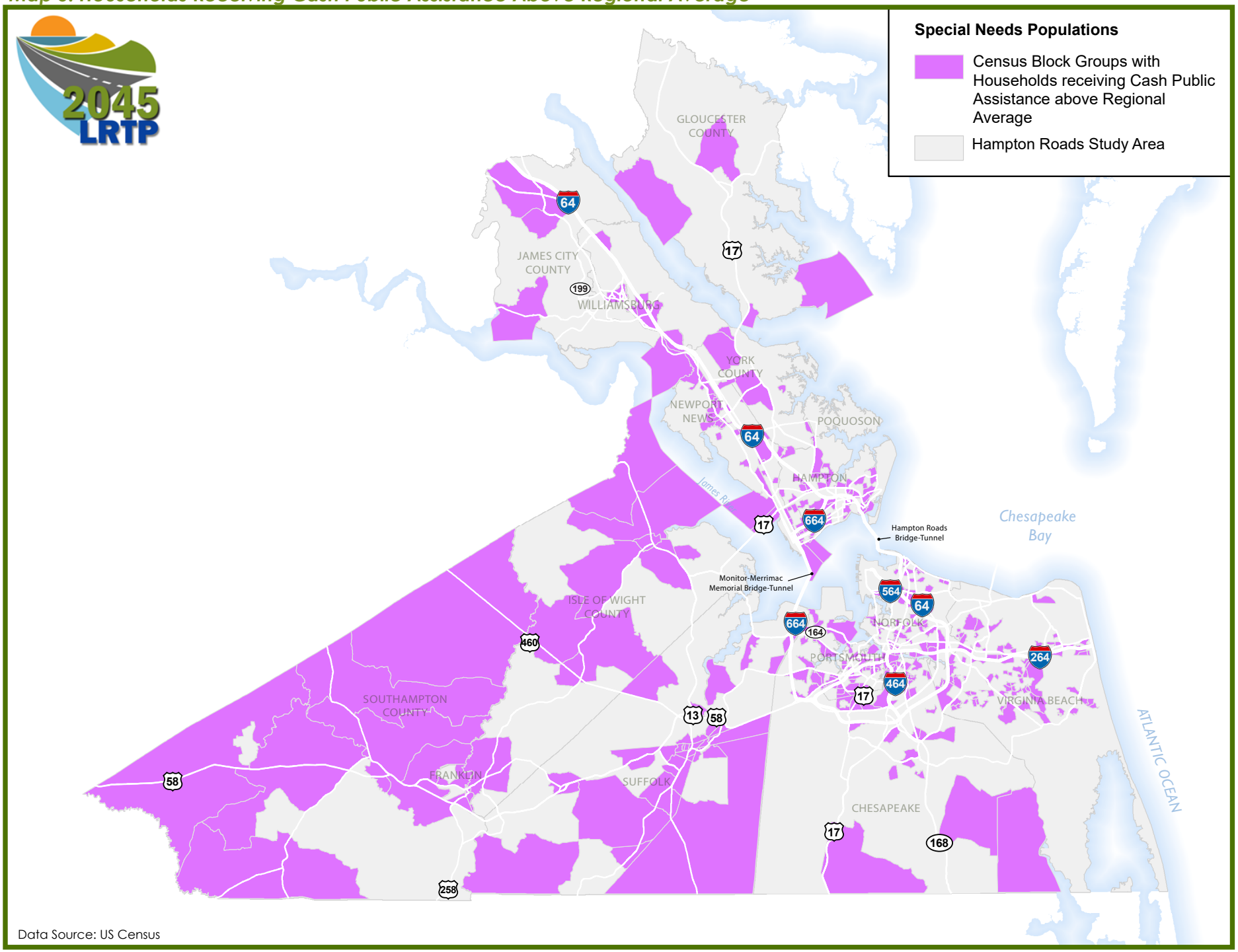
Data Source: US Census

Map 4: Female Head of Households Above Regional Average



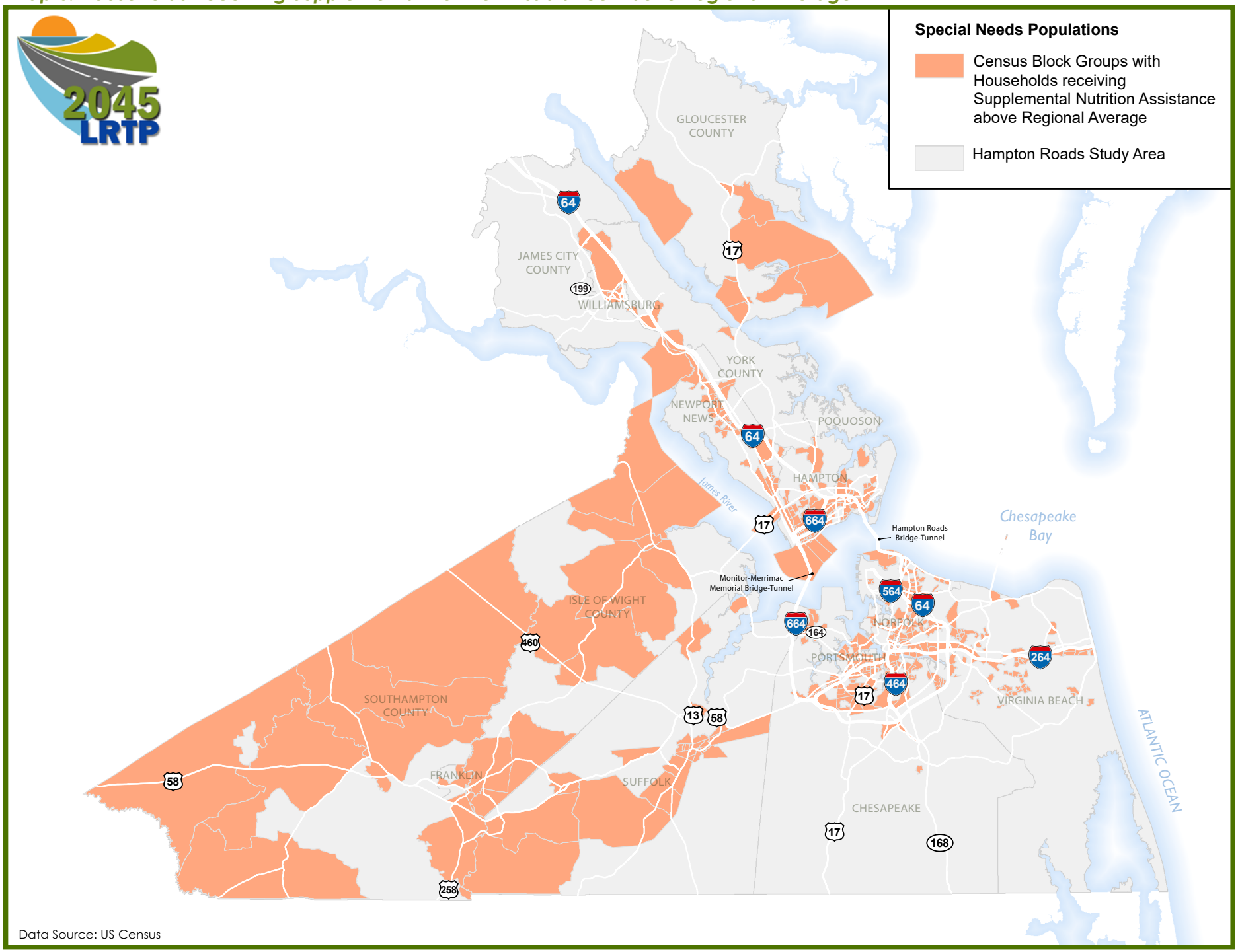
Data Source: US Census

Map 5: Households Receiving Cash Public Assistance Above Regional Average



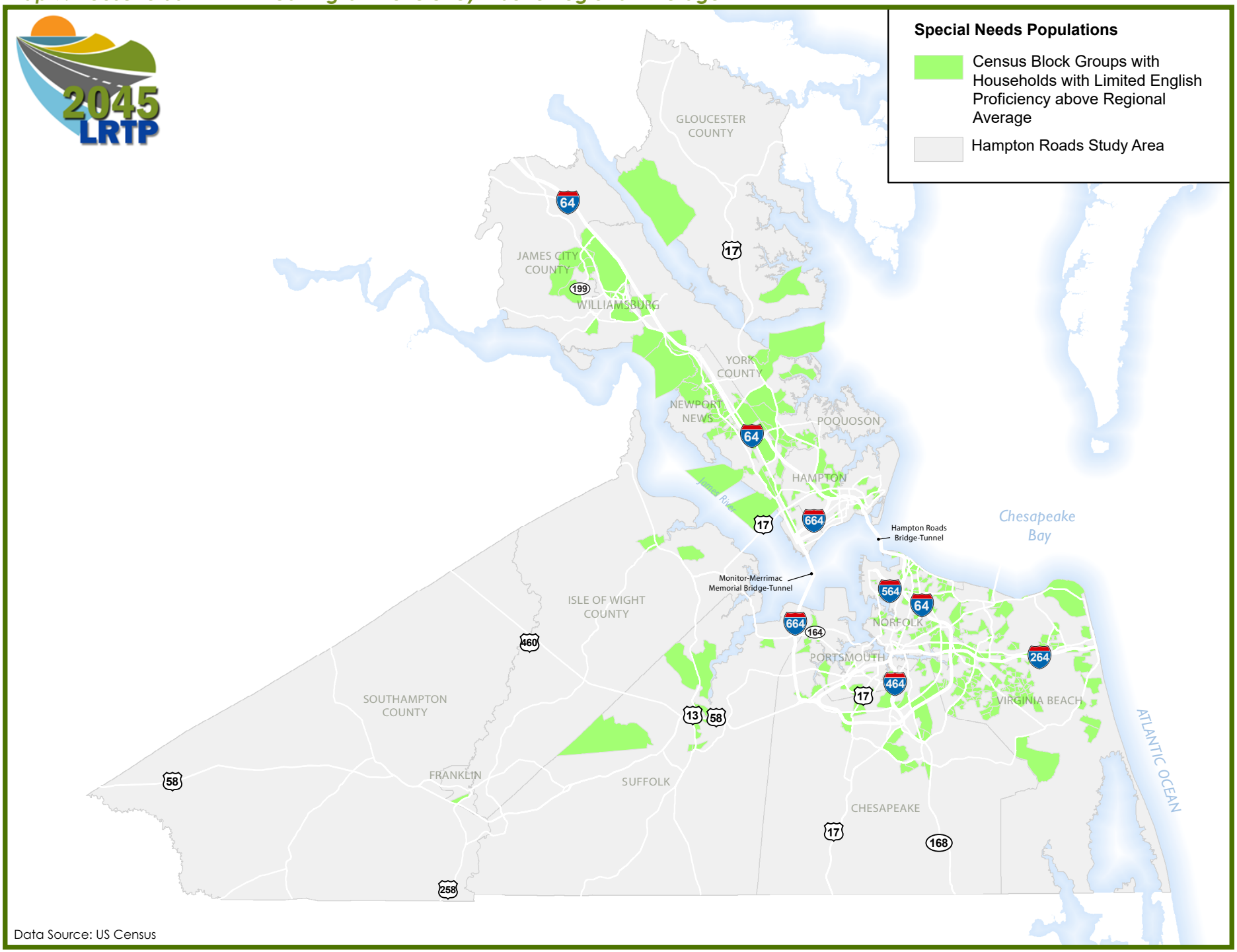
Data Source: US Census

Map 6: Households Receiving Supplemental Nutrition Assistance Above Regional Average



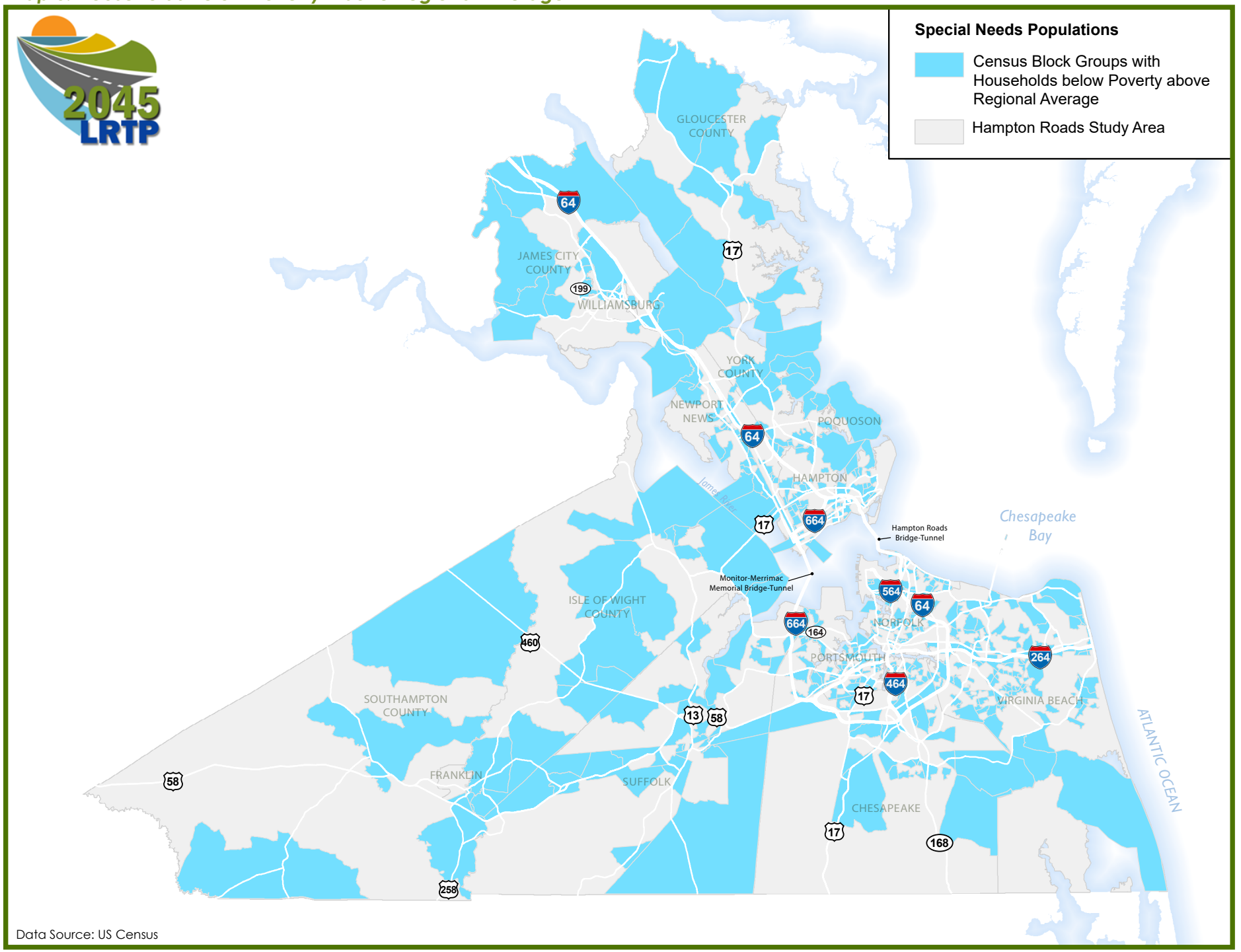
Data Source: US Census

Map 7: Households with Limited English Proficiency Above Regional Average



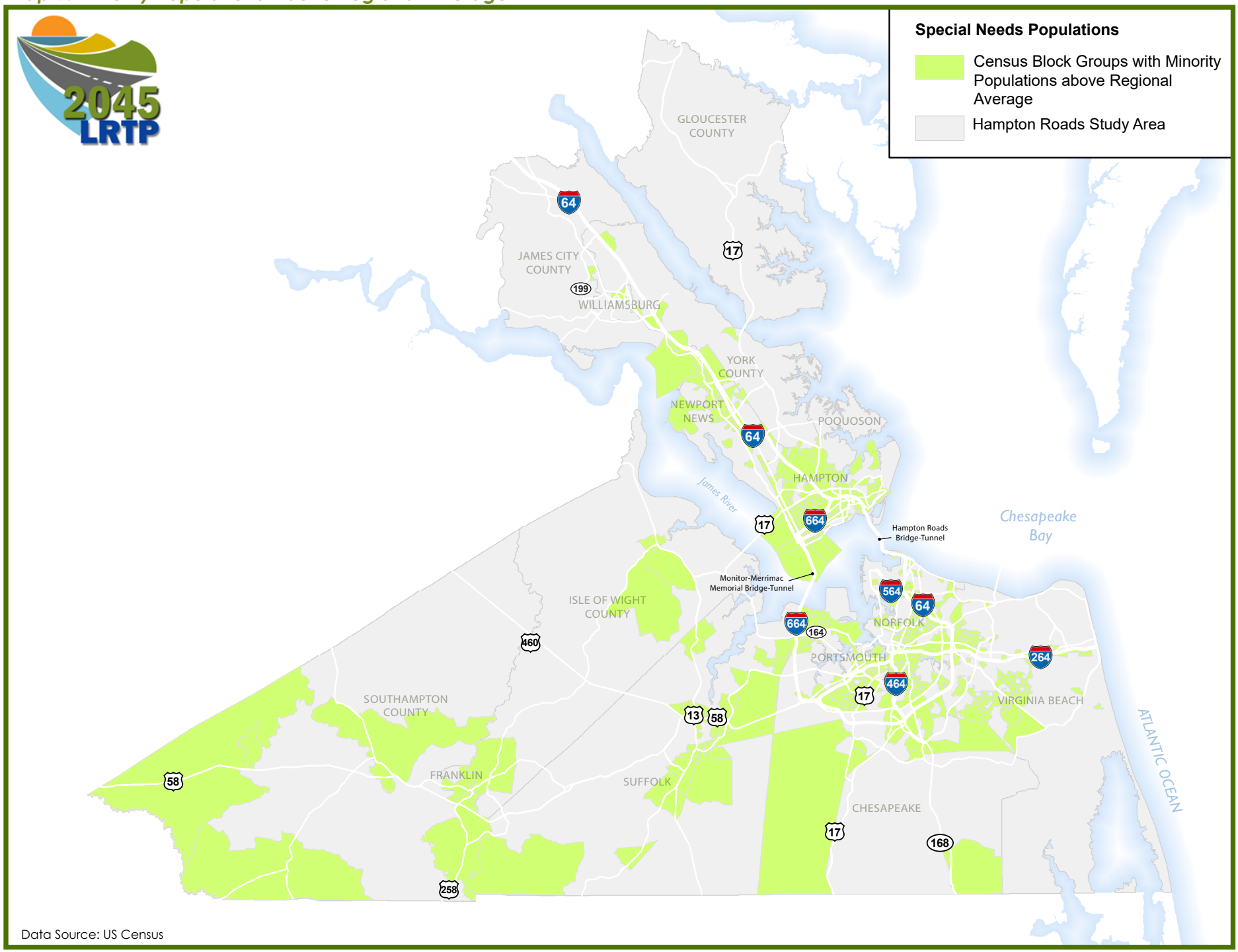
Data Source: US Census

Map 8: Households Below Poverty Above Regional Average



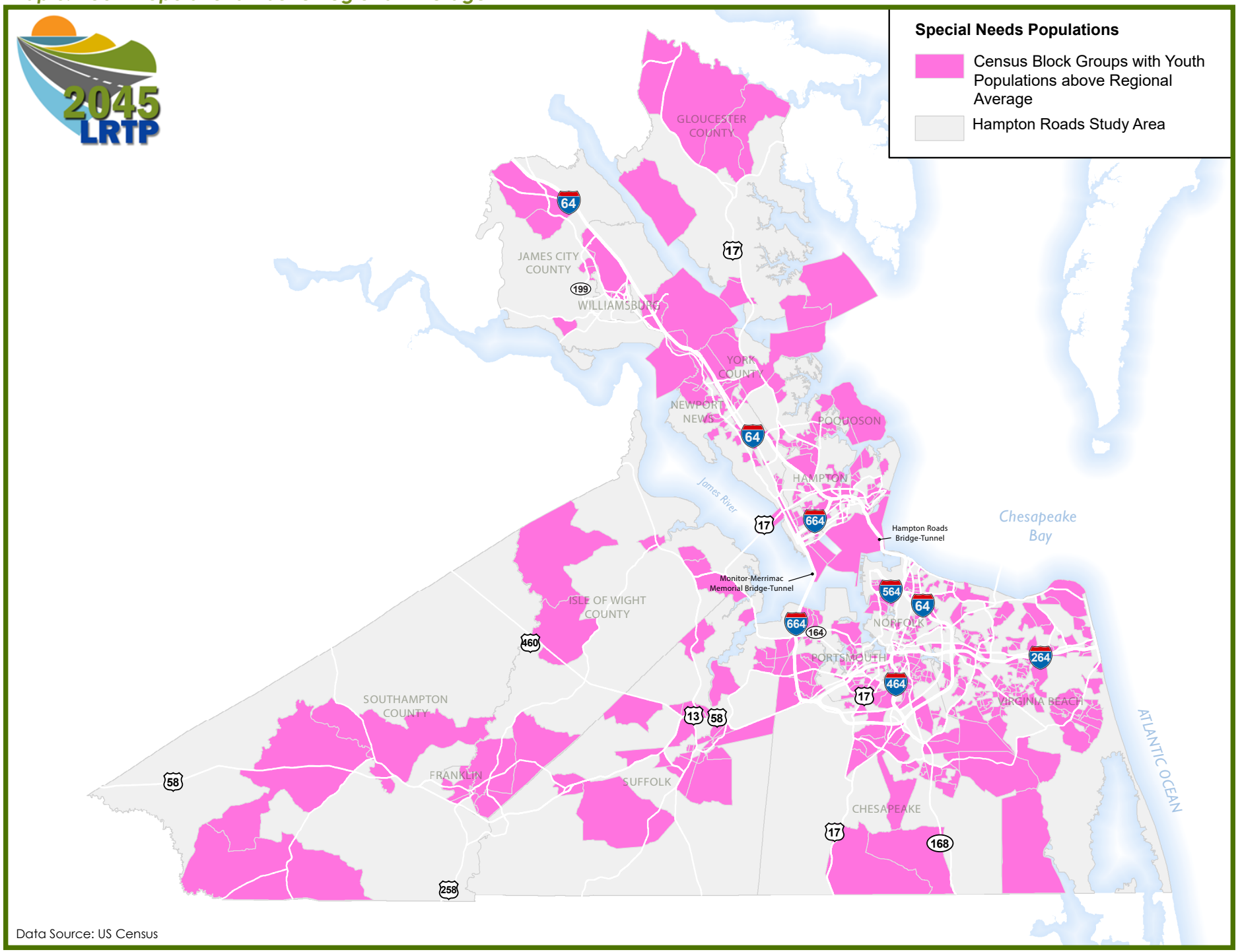
Data Source: US Census

Map 9: Minority Populations Above Regional Average



Data Source: US Census

Map 8: Youth Populations Above Regional Average



Data Source: US Census

STRATEGIES FOR SPECIAL NEEDS POPULATIONS

In an attempt to meet the challenges affecting the mobility and accessibility of populations experiencing barriers to mobility, transportation and land-use planners have collaborated to develop strategies to address some of the problems this population faces.

At the local level, jurisdictions can encourage mixed-use activity centers through future land use planning and zoning. Concurrently, localities can invest in infrastructure and support services to further entice mixed-use development. In the HRTPO Non-Driver Opportunity Analysis study, which identifies how to maximize the travel opportunity of non-drivers to multimodal activity centers, several recommendations were made for localities to focus land use, transportation, and development efforts to improve mobility.

On the regional level, transit providers can encourage the clustering of enhanced, frequent, and accessible transit services within locally designated growth areas, thus promoting accessibility and mobility between mixed-use activity centers. Transit providers can also provide the audible identification of stops for visually-impaired passengers, as well as improved vehicle and transit stop accessibility to promote the mobility of populations with special needs. Transit providers are also encouraged to operate equitable and efficient service for all eligible users. As such, transit providers in the region offer paratransit services (flexible, non-fixed route transit services). Paratransit services can supplement the fixed-route transit system either as a feeder or alternative service for users with mobility needs.

Additionally, alternative options for users with medical or functional needs can be made available. Through ride-sharing programs, voucher programs, and private transportation providers meeting Americans with Disability Act (ADA) guidelines, users with medical or functional needs will have the opportunity to more easily travel throughout Hampton Roads. Local and state agencies can also continue to retrofit the transportation network with operational improvements. Prompted by the ADA, many improvements have been made to the regional transportation system, including changes in signage, curb ramps, crosswalk enhancements, and transportation services. Public partnerships can also help to improve the overall mobility of non-drivers through the coordination of housing, transportation, and activity center development.

A regional effort recently completed includes strategies for improving non-motorized transportation options: the HRTPO *Linking Hampton Roads*: a Regional Active Transportation Plan. In this plan, critical next step recommendations for the region include:

- Adoption of Complete Street Policies
- Pedestrian and bicycle safety
- Designate ½ mile zone around schools for pedestrian facilities

In addition to this effort, HRTPO staff is also working on a gap analysis that will analyze the sidewalk inventory around schools. Future efforts will include analyzing the sidewalk inventory around transit stops and economic destinations.

CONGESTION

Roadway congestion is a primary concern for many residents in Hampton Roads because it can adversely impact quality of life and regional commerce, particularly in critical sectors around the region that depend heavily on the transportation network such as the military, freight movement, and tourism.

Roadway congestion in Hampton Roads is typical compared to many other large metropolitan areas throughout the country. There are multiple analyses – including ones produced by the Federal Highway Administration (FHWA) and the Texas Transportation Institute (TTI) – that compare congestion levels in metropolitan areas using travel speed data collected by companies like TomTom and INRIX. These congestion levels are determined using a measure called the Travel Time Index. The Travel Time Index is defined as the percentage of extra travel time the average trip takes during the peak travel period compared to uncongested conditions.

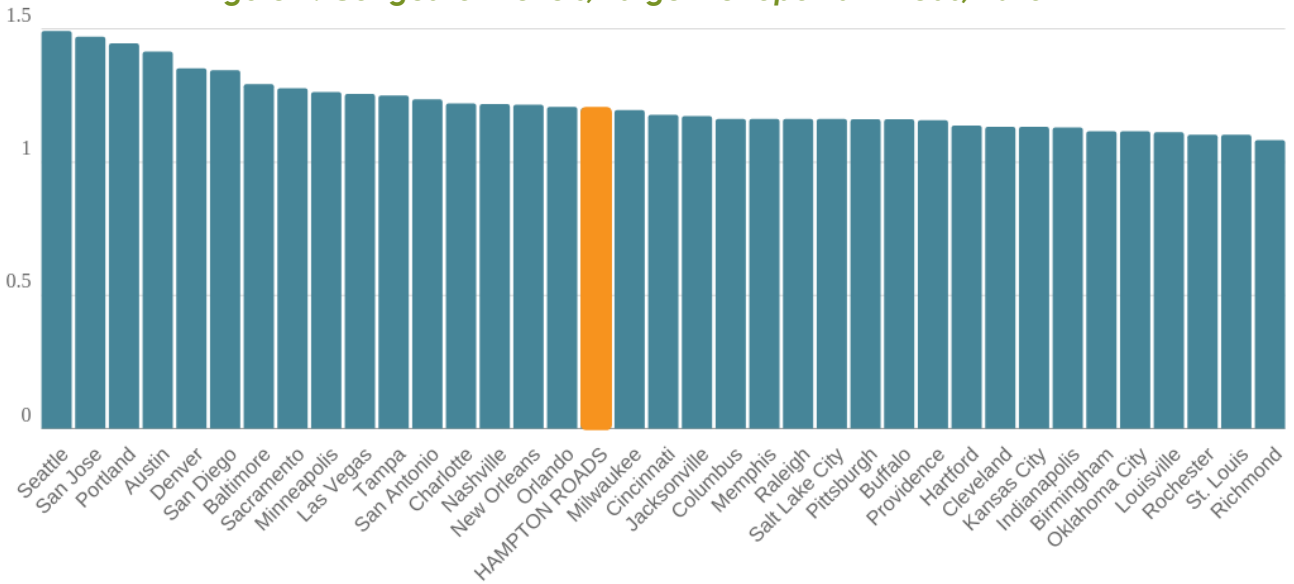
According to the FHWA Urban Congestion Report, which uses INRIX travel speed data, the Travel Time Index in Hampton Roads was 1.20 in 2018, meaning the average trip took 20% longer to complete during peak periods than during uncongested periods. Hampton Roads had the 17th highest Travel Time Index in the country among the 37 comparable large metropolitan areas with populations between one and four million people that are included in FHWA's analysis.

This congestion directly and indirectly costs local residents hundreds of millions of dollars. According to the Texas Transportation Institute, commuters traveling by automobile in Hampton Roads spent an average of 46 hours stuck in congestion in 2017. This resulted in 14 million gallons of excess fuel consumed and an average congestion cost of $690 per auto commuter due to wasted time and fuel. This amounts to nearly three quarters of a billion dollars ($741 million) for all commuters in the region.

HRTPO staff evaluates current roadway conditions as part of the Congestion Management Process (CMP), which is explained in further detail later in this section. For the CMP report, HRTPO staff determined the Existing (2018) congestion levels for regional roadways using a combination of INRIX travel time and speed data and Highway Capacity Manual methodologies for roadways without INRIX data.

Maps 10-11 on pages 18-19 show the 2018 Existing roadway congestion levels during the AM Peak Period for the Peninsula and the Southside subregions of Hampton Roads. Maps 12-13 on pages 20-21 show the same information during the PM Peak Period.

Figure 4: Congestion Levels, Large Metropolitan Areas, 2018



Data Source: FHWA Urban Congestion Report. The Travel Time Index is the extra travel time the average trip takes during the peak period as compared to uncongested conditions in each region.

As shown in the maps, a number of high-profile locations throughout Hampton Roads are severely congested during the peak periods. These include the Hampton Roads Bridge-Tunnel, Downtown Tunnel, Midtown Tunnel, Monitor-Merrimac Memorial Bridge-Tunnel, High Rise Bridge, and additional sections of I-64, I-264, and I-664 throughout the region.

HRTPO staff used the roadway segment congestion analysis to calculate existing congestion levels on a regional basis. As shown in Figure 5, 275 of the 4,991 lane-miles (5.5%) in the Hampton Roads CMP Roadway Network currently operate under severely congested conditions during the AM Peak Period. Another 520 lane-miles (10.4%) operate under acceptable but moderately congested conditions, while the remaining 4,196 lane-miles (84.1%) have low levels of congestion.

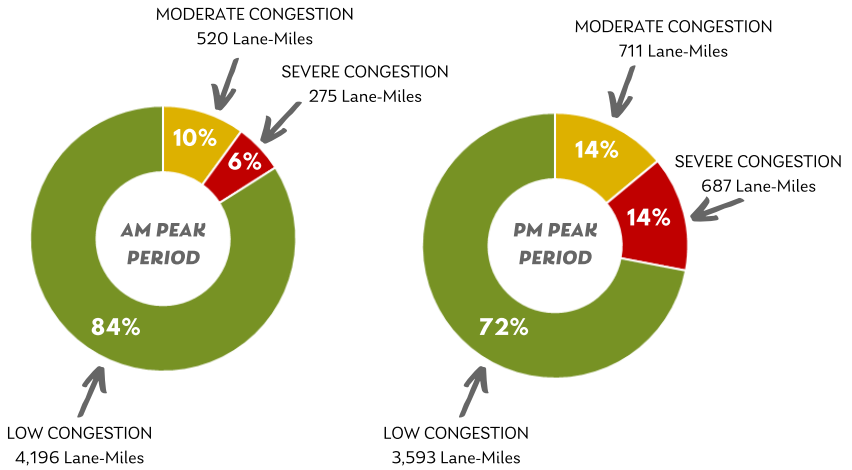
A much higher percentage of the CMP Roadway Network is congested during the PM Peak Period than during the AM Peak Period. A total of 687 of the 4,991 lane-miles (13.8%) currently operate under severely congested conditions during the PM Peak Period. Another 711 lane-miles (14.3%) operate under moderately congested conditions, and the remaining 3,593 lane-miles (72.0%) are roadways that operate with low levels of congestion.

In addition to analyzing regional congestion levels by lane-mile, which is a measure of the physical roadway system, HRTPO staff also analyzed regional congestion levels by daily vehicle-miles of travel, which is a measure of the total amount of travel. This measure better represents the congestion experienced by travelers throughout the region each weekday.

As shown in Figure 6, 282,000 of the 2.55 million vehicle-miles of travel (11.1%) on the Hampton Roads CMP Roadway Network each weekday currently occurs under severely congested conditions during the AM Peak Period. Another 381,000 vehicle-miles of travel (14.9%) occurs under acceptable but moderately congested conditions, while the remaining vehicle-miles of travel (74.0%) have low levels of congestion.

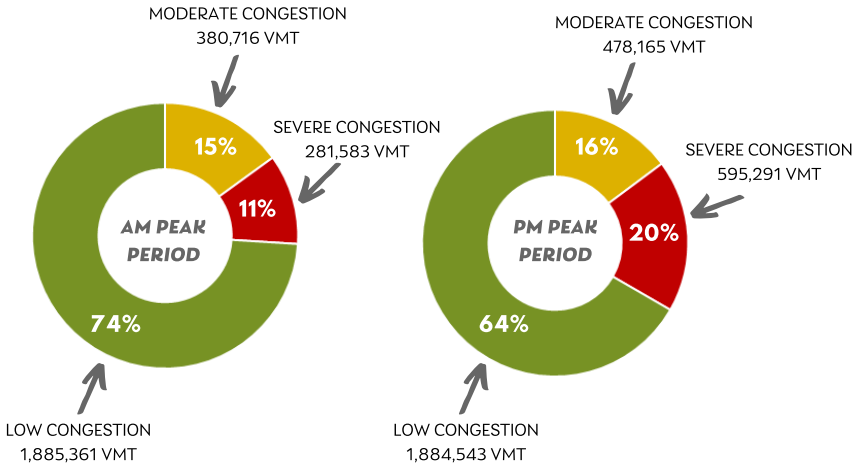
Similar to lane-miles, a much higher percentage of travel on the CMP Roadway Network is congested during the PM Peak Period than during the AM Peak Period. A total of 595,000 of the daily 2.96 million vehicle-miles of travel (20.1%) currently occurs under severely congested conditions during the PM Peak Period. Another 478,000 vehicle-miles of travel (16.2%) occurs under moderately congested conditions, and the remaining vehicle-miles of travel (63.7%) occurs with low levels of congestion.

Figure 5: Existing (2018) Congestion Levels by Lane- Miles For the CMP Roadway Network



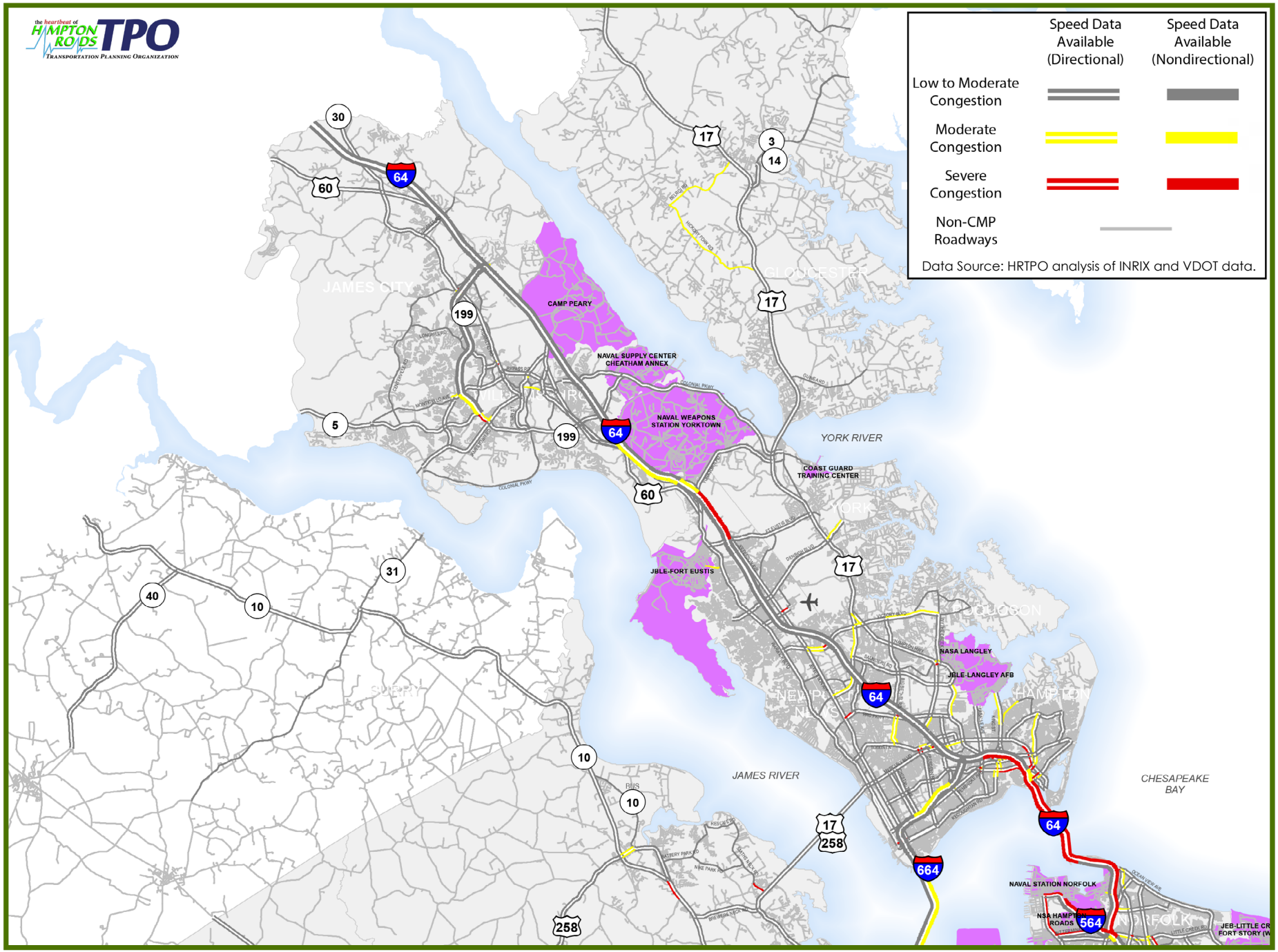
Source: HRTPO analysis of INRIX and VDOT data. Figure only includes those roadways in the CMP network within the Hampton Roads Metropolitan Planning Area (MPA).

Figure 6: Existing (2018) Congestion Levels by Vehicle-Miles of Travel for the CMP Roadway Network

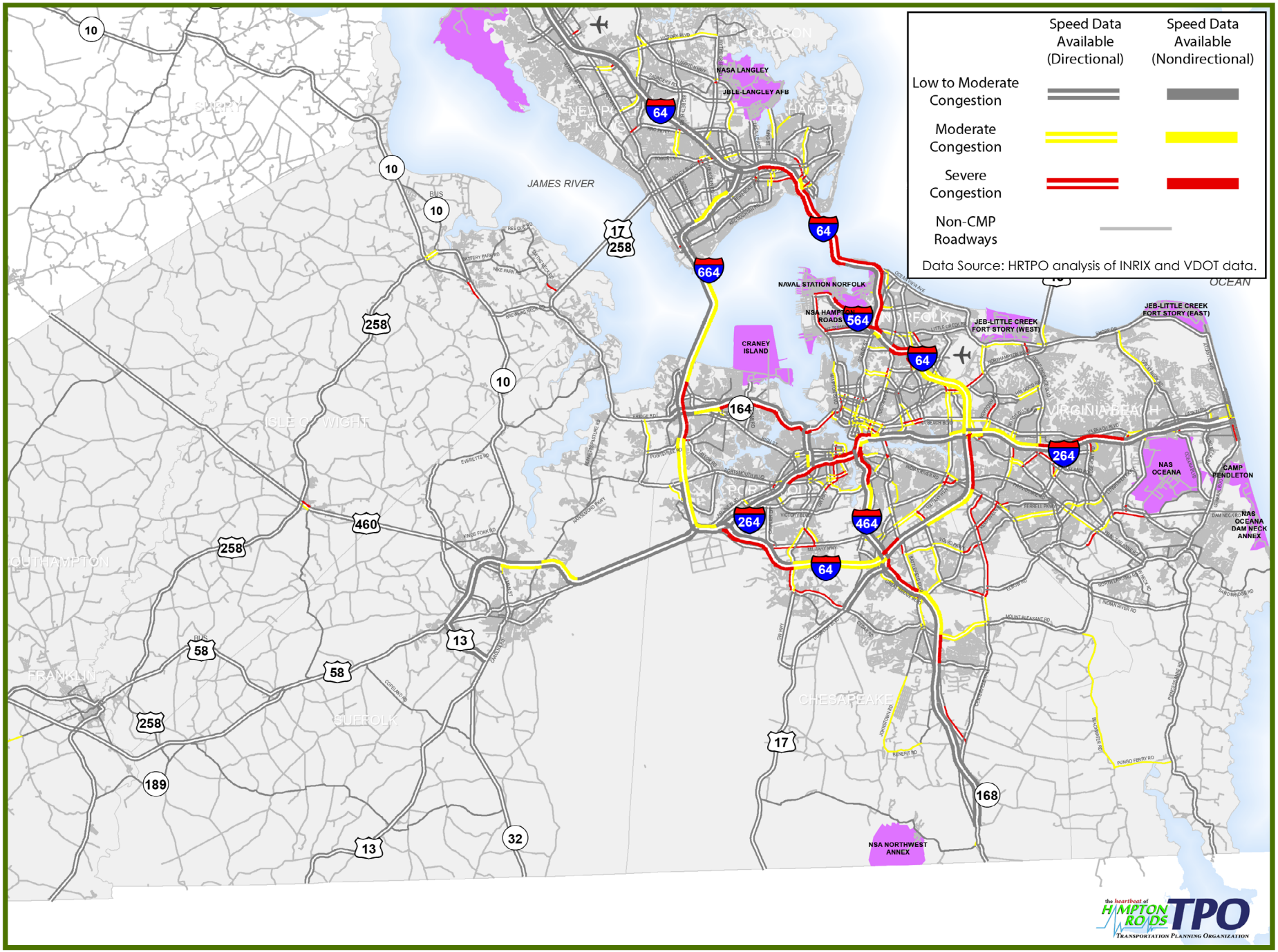


Source: HRTPO analysis of INRIX and VDOT data. Figure only includes those roadways in the CMP network within the Hampton Roads Metropolitan Planning Area (MPA).

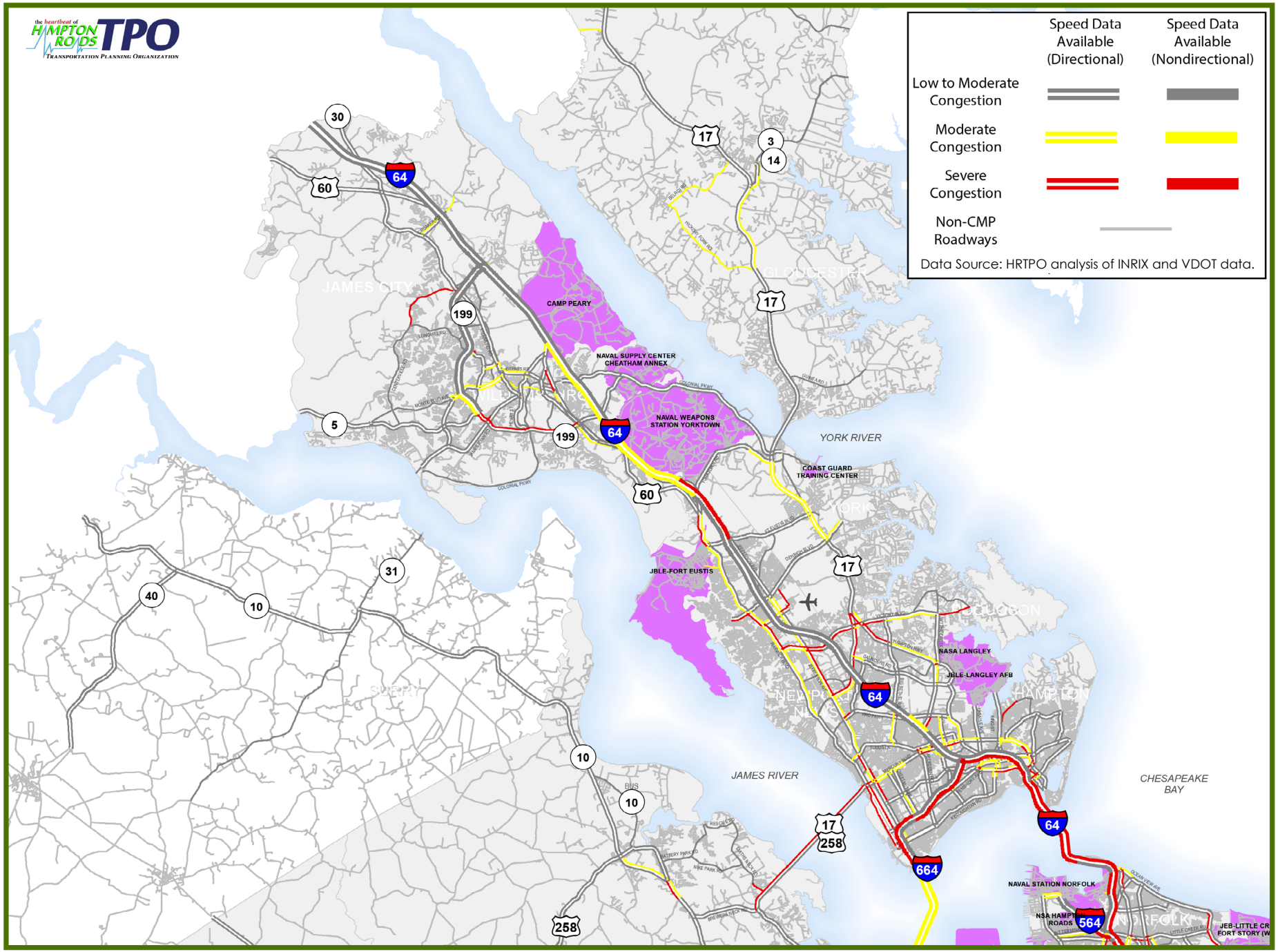
Map 11: AM Peak Period Congestion Levels, Peninsula (2018 EXISTING)



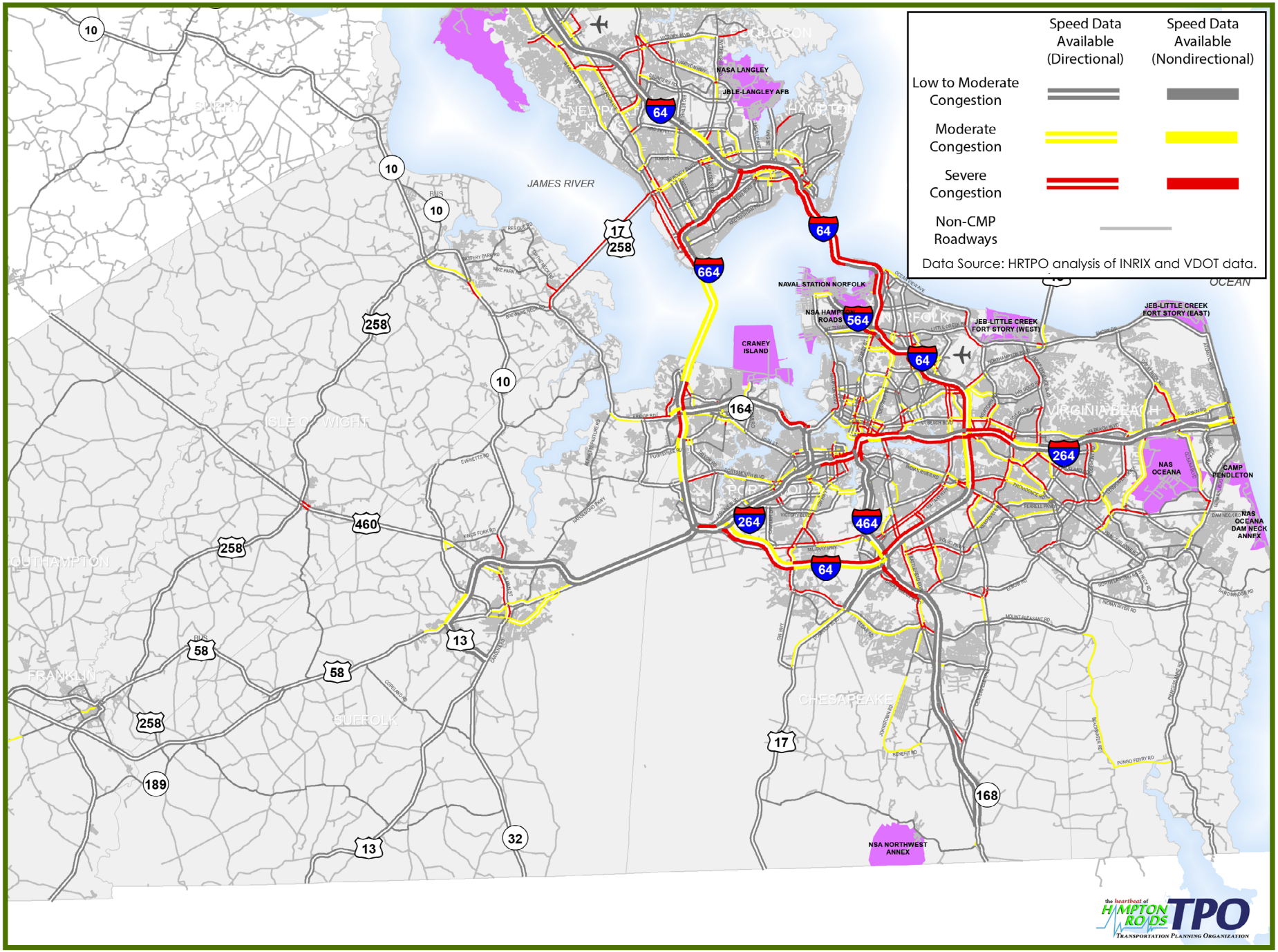
Map 12: AM Peak Period Congestion Levels, Southside (2018 EXISTING)



Map 13: PM Peak Period Congestion Levels, Peninsula (2018 EXISTING)



Map 14: PM Peak Period Congestion Levels, Southside (2018 EXISTING)



STRATEGIES TO MONITOR AND IMPROVE CONGESTION

In order to evaluate current roadway conditions, assess regional transportation needs, and outline strategies to manage current and future roadway congestion, the HRTPO staff maintains a Congestion Management Process (CMP).

The Hampton Roads CMP is an on-going systematic process for managing congestion that provides information and analysis on multimodal transportation system performance and on strategies to alleviate congestion and enhance the mobility of persons and goods regionwide. During this process, HRTPO works with many stakeholders to develop these strategies and mobility options. Federal regulations require that a CMP be in place in all Transportation Management Areas (TMAs), which are urban areas over 200,000 in population.

HRTPO updates the *Hampton Roads Congestion Management Process* report every five years. The most recent CMP report was released in 2014, but HRTPO staff is currently producing the 2020 update to the report.

The Hampton Roads Congestion Management Process takes a regional approach to identify and address congestion concerns, and develops and utilizes a "toolbox" of strategies to address congested locations. All strategies – including managing demand, shifting trips to other modes, reducing travel via single occupant vehicles, and improving transportation system management and operations – are considered as part of the CMP, with adding roadway capacity being considered as the last resort. These general congestion mitigation strategies are shown on the following page.

Page 23 provides a preview of five strategies contained in the CMP Congestion Mitigation Toolbox.

The 2014 CMP report includes a detailed analysis of 18 congested corridors (6 freeways, 12 arterials) located throughout Hampton Roads. These CMP Congested Corridors were selected not only on congestion levels but also congestion duration, total delay, travel time reliability, truck volumes, safety, and importance to the military. For each corridor, all of the congestion mitigation strategies in the "toolbox" were examined to determine whether each strategy is currently in use within the corridor, and if not, whether the particular strategy could benefit the corridor. Potential congestion mitigation strategies are highlighted based on data analysis, site observations, and input from localities. This process will be repeated in *Part III – Congestion Mitigation Strategies* of the *Congestion Management Process 2020 Update*.

Please visit the HRTPO Congestion Management webpage for more information on congestion management efforts, including the *Hampton Roads Congestion Management Process – System Performance and Mitigation* report.

THE CMP ASSISTS METROPOLITAN PLANNING ORGANIZATIONS (MPOS) WITH PERFORMING THE FOLLOWING ACTIONS FOR THE REGIONAL TRANSPORTATION SYSTEM:

- Develop regional objectives for congestion management
- Define the regional CMP network
- Develop multimodal performance measures
- Collect data/monitor system performance
- Analyze congestion problems and needs
- Identify and assess strategies
- Program and implement strategies
- Evaluate strategy effectiveness

Figure 7: Congestion Management Process

HRTPO CMP CONGESTION MITIGATION STRATEGIES

- ELIMINATE PERSON TRIPS OR REDUCE VMT
- SHIFT TRIPS FROM AUTOMOBILE TO OTHER MODES
- SHIFT TRIPS FROM SINGLE OCCUPANCY VEHICLES (SOV) TO HIGH OCCUPANCY VEHICLES (HOV)
- IMPROVE ROADWAY OPERATIONS
- ADD CAPACITY

Figure 8: Examples of CMP Strategies from the Toolbox

STRATEGY #1
ELIMINATE PERSON TRIPS OR REDUCE VMT

GROWTH MANAGEMENT/ACTIVITY CENTERS

1.1 Land Use Policies/Regulations/Smart Growth

Encourage more efficient patterns of commercial or residential development in defined areas. Specific land use policies and/or regulations that could significantly decrease both the total number of trips and overall trip lengths, as well as making transit use, bicycling and walking more viable include, but are not limited to the following:

- Encouraging development in existing centers and/or communities (i.e. infill development)
- Discouraging development outside of designated growth areas
- Promoting higher density and mixed uses in proximity to existing or planned transit service (i.e Town Centers)
- Establishing a policy for new and existing subdivisions to include sidewalks, bike paths, and transit facilities where appropriate
- Developing and implementing policies that require streets to be designed for all modes and users (i.e. Complete Streets, Road Diets)

CONGESTION/VALUE PRICING

1.2 Road User Fees

Includes area-wide pricing fees, time-of-day/congestion pricing and tolls. Most appropriately applied to freeways and expressways and requires infrastructure to collect user fees.

1.3 Parking Fees

Market-based strategy designed to modify mode choice by imposing higher costs for parking private automobiles. Most appropriately applied to parking facilities in urban environments.

TRANSPORTATION DEMAND MANAGEMENT

1.4 Outreach/Marketing for Transportation Demand Management/Transit Service

Promoting and advertising existing services to encourage increased participation and use of transit and TDM strategies (i.e. TRAFFIX)

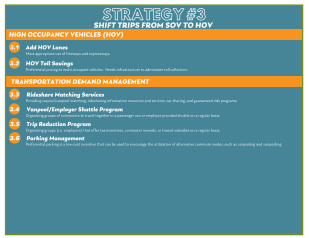
1.5 Telecommuting/Remote Access

Encouraging employers to consider telecommuting options full- or part-time to reduce travel demand.

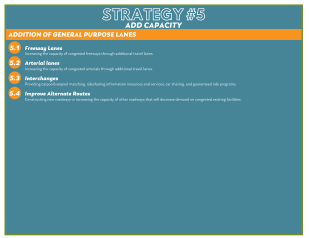
1.6 Employee Flextime Benefits/Compressed Work Week

Encouraging employers to consider allowing employees to maintain a flexible schedule - thus allowing the employee the option to commute during non-peak hours.


STRATEGY #2
SHIFT TRIPS FROM AUTO TO OTHER MODES
PUBLIC TRANSIT CAPITAL IMPROVEMENTS
2.1 Exclusive Right-of-Way - New Rail Service
2.2 Exclusive Right-of-Way - New Bus Facilities
2.3 Ferry Services
2.4 Fleet Expansion
2.5 Improved Intermodal Connections
2.6 Improved/Increased Park & Ride Facilities & Capital Improvements
PUBLIC TRANSIT OPERATIONAL IMPROVEMENTS
2.7 Service Expansion
2.8 Traffic Signal Preemption
2.9 Improved Transit Performance
2.10 Transit Fare Reductions Plan/Reduced Rate of Fare
2.11 Transit Information Systems
ACTIVE TRANSPORTATION MODES
2.12 Improved/Expanded Bicycle Network
2.13 Bicycle Storage Systems
2.14 Improved/Expanded Pedestrian Network


STRATEGY #3
SHIFT TRIPS FROM SOV TO HOV
HIGH OCCUPANCY VEHICLES (HOV)
3.1 Add HOV Lanes
3.2 HOV Toll Savings
TRANSPORTATION DEMAND MANAGEMENT
3.3 Rideshare Matching Services
3.4 Vanpool/Employer Shuttle Program
3.5 Trip Reduction Program
3.6 Parking Management


STRATEGY #4
IMPROVE ROADWAY OPERATIONS
TRAFFIC OPERATIONAL & SAFETY IMPROVEMENTS
4.1 Geometric Improvements
4.2 Intersection Channelization
4.3 Intersection Turn Restrictions
4.4 Intersection Signalization Improvements
4.5 Innovative Intersections and Interchanges
4.6 Coordinated Interconnected Signals
4.7 Roadway Environment
4.8 Traffic Calming
4.9 Intelligent Transportation Systems/Transportation Operations Center (TOC)
4.10 Freight Policies and Improvements
4.11 Transportation Security
4.12 Active Traffic Management (ATM)
4.13 Incident Management, Detection, Response & Clearance
4.14 Construction/Work Zone Management
4.15 Elimination of Bottlenecks
4.16 Ramp Metering
4.17 Part-Time Shoulder Use
4.18 High Occupancy Toll (HOT)/Express Lanes
4.19 Access Control and Connectivity
4.20 Median Control


STRATEGY #5
ADD CAPACITY
ADDITION OF GENERAL PURPOSE LANES
5.1 Freeway Lanes
5.2 Arterial Lanes
5.3 Interchanges
5.4 Improve Alternate Routes

TRAVEL TIME RELIABILITY

Roadway congestion is prevalent throughout Hampton Roads, but congestion levels are not the same each day. Daily congestion levels can vary greatly from average congestion levels due to a variety of factors including crashes, bad weather, special events, or roadway maintenance.

Travel time reliability is defined as how steady travel times are over the course of time, as measured generally from day to day. The consistency and dependability of travel times is very important for many roadway users, such as those that must arrive on time to work or an appointment, catch a flight at the airport, or pick up children from day care. The less reliable trips are, the earlier travelers must leave in order to guarantee arriving at their destination on time, leaving less time for other endeavors.

A measure commonly used to describe the travel time reliability of the roadway network is the planning time index. The planning time index measures reliability by comparing travel times during some of the most congested conditions with travel times in free-flow, uncongested conditions. The planning time index is calculated using the following formula:

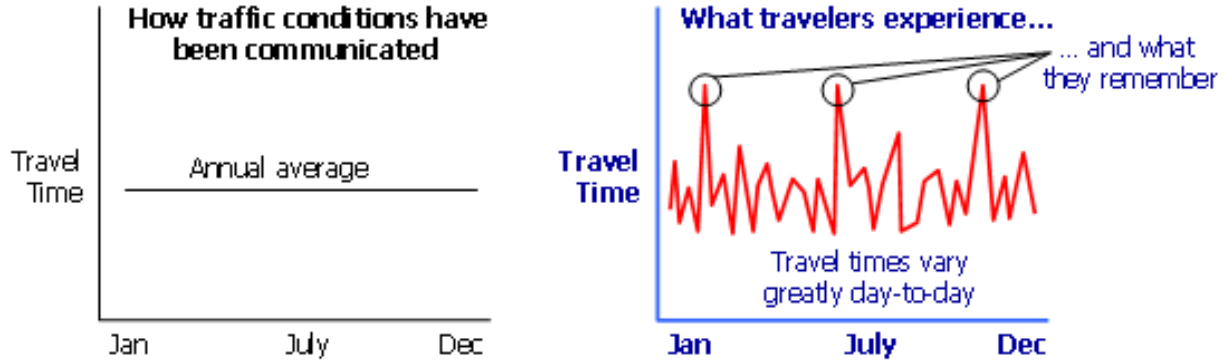
$$\text{Planning Time Index} = \frac{\text{95th percentile travel time}}{\text{Free-flow travel time}}$$

The planning time index is generally greater than or equal to one and increases as the roadway network becomes more congested and less reliable.

As part of the *Urban Mobility* Report, the Texas Transportation Institute (TTI) measures the regional planning time index of the freeway network in urbanized areas throughout the country. According to TTI, the freeway planning time index in Hampton Roads in 2017 was 1.46, meaning that for an average uncongested 20-minute trip, just over 29 minutes should be allocated during peak periods to be on time 95% of the time. The Hampton Roads planning time index ranked 24th highest among the 39 metropolitan areas throughout the country with populations between one and four million people.

Another method of measuring travel time reliability that was recently instituted for Federally-required performance measures and target setting is the Level of Travel Time Reliability (LOTTR). The LOTTR is defined as the ratio of the 80th percentile travel time to the mean (50th percentile) travel time during four reporting periods throughout the year: weekday morning peak (6 – 10 am), weekday midday (10 am – 4 pm), weekday afternoon peak (4 pm – 8 pm), and weekends (6 am – 8 pm). Segments are considered to be unreliable if any of the four LOTTR ratios are 1.50 or greater.

Figure 9: Average Versus Daily Travel Times



Source: FHWA

HRTPO staff analyzed travel time and speed data collected in 2018 by INRIX to calculate the LOTTR ratios for roadways throughout the region, which are shown in Maps 15-16. Most of the roadway segments with the highest LOTTR ratios in Hampton Roads are freeway segments, particularly those approaches to the tunnels, the High-Rise Bridge, and Naval Station Norfolk.

Figure 10: Relationship Between Various Delay and Reliability Measures

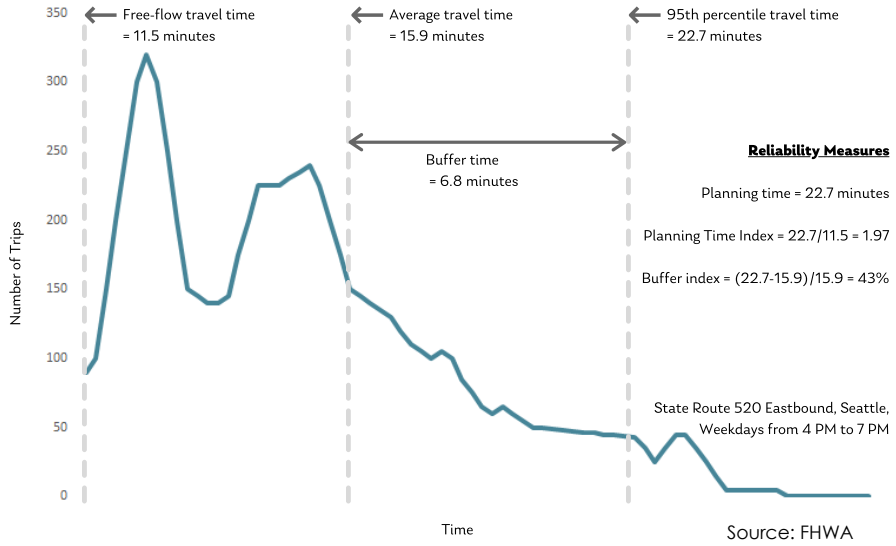
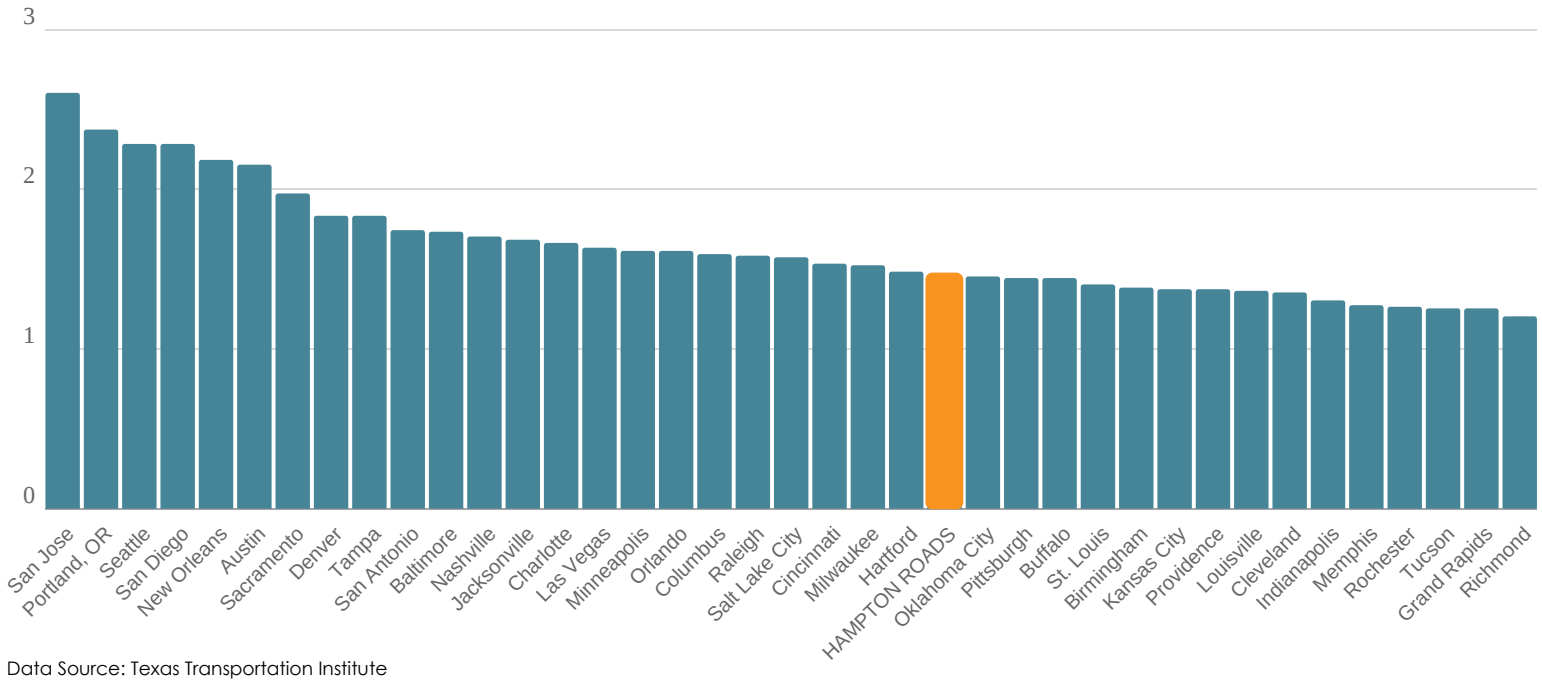
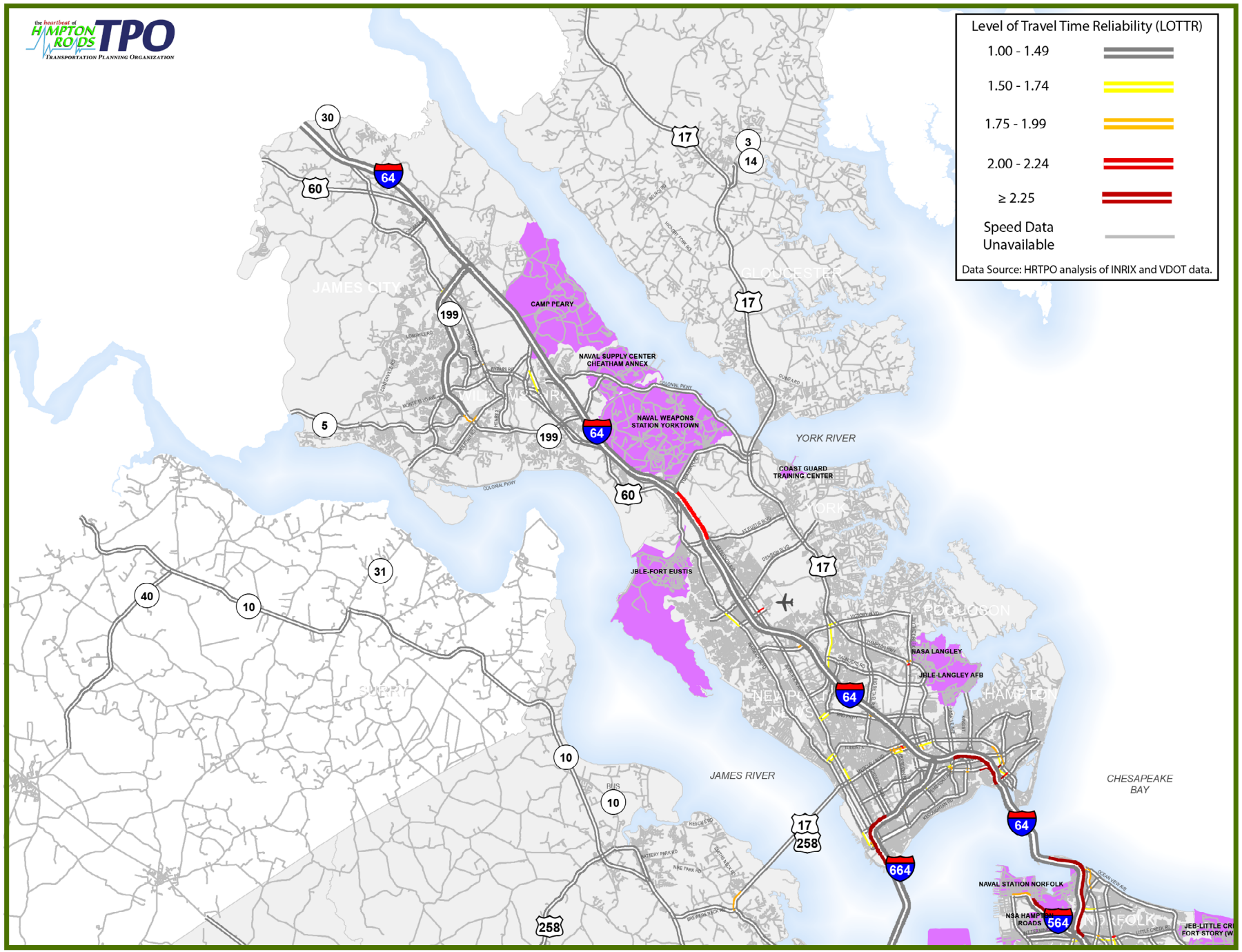


Figure 11: Freeway Planning Time Index, Large Urbanized Areas, 2017

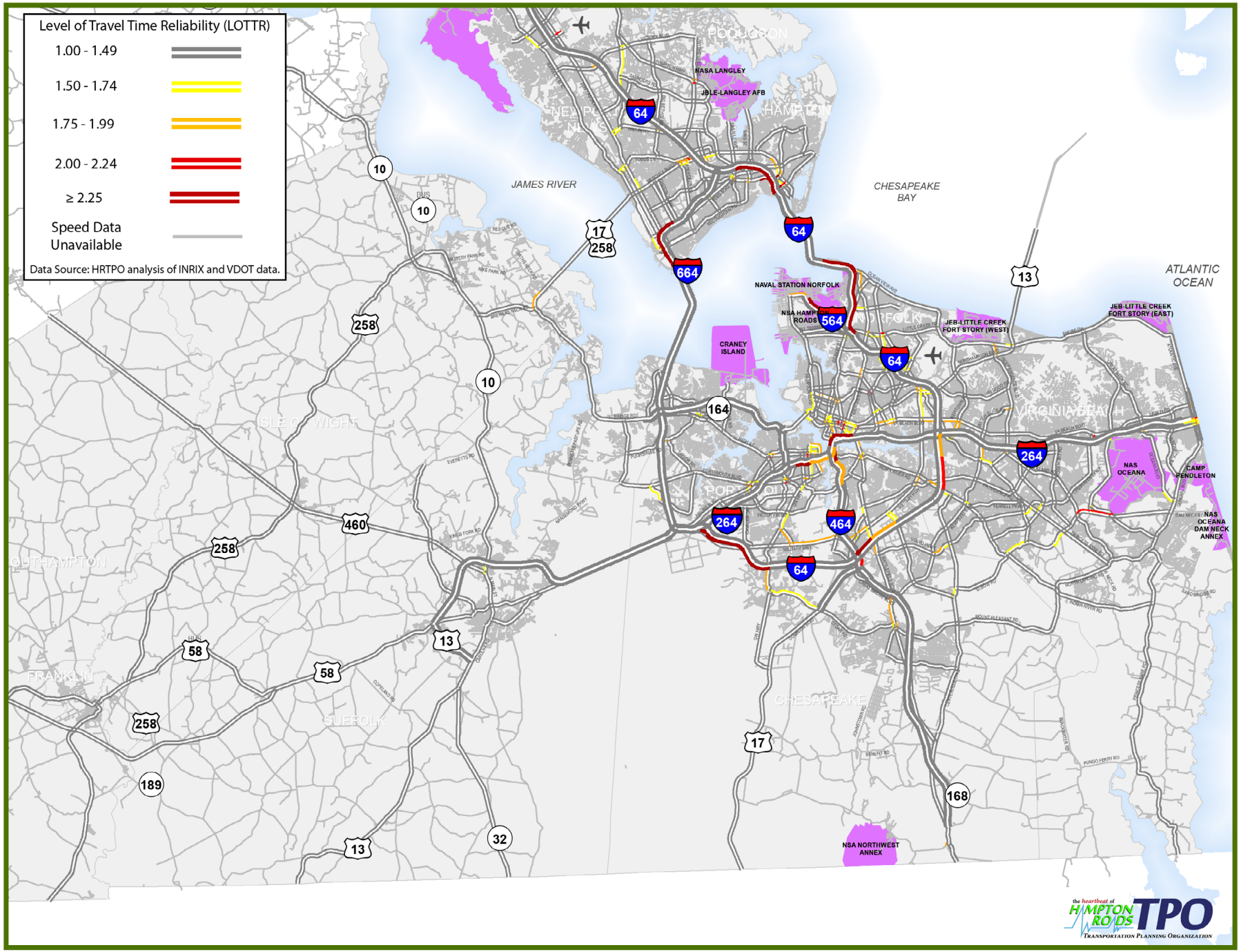


Data Source: Texas Transportation Institute

Map 15: Level of Travel Time Reliability, Peninsula (2018)



Map 16: Level of Travel Time Reliability, Southside (2018)



TRAVEL TIME RELIABILITY STRATEGIES

There are many factors that impact travel time reliability including crashes, bad weather, special events, and work zones. A number of strategies are available – and have been implemented in Hampton Roads – to improve travel time reliability. Most strategies to improve travel time reliability are operational improvements, since they directly target the sources of unreliable travel. Examples of operational strategies include:

Freeway Management - In Hampton Roads, the freeway system is managed by the Hampton Roads Transportation Operations Center (HRTOC). The HRTOC was established by VDOT as the Hampton Roads Traffic Management Center (TMC) in 1992 to address growing congestion and reliability challenges. The TMC initially covered 19 miles of freeway on the Southside, using 38 cameras and 64 changeable message signs.

As of 2018, the HRTOC covers a total of 141 roadway miles – nearly the entire regional freeway system. This system includes over 300 CCTV cameras, 200 changeable message signs, five reversible roadway gate entrances, and hundreds of vehicle detection devices, all linked together by fiber optic cable.

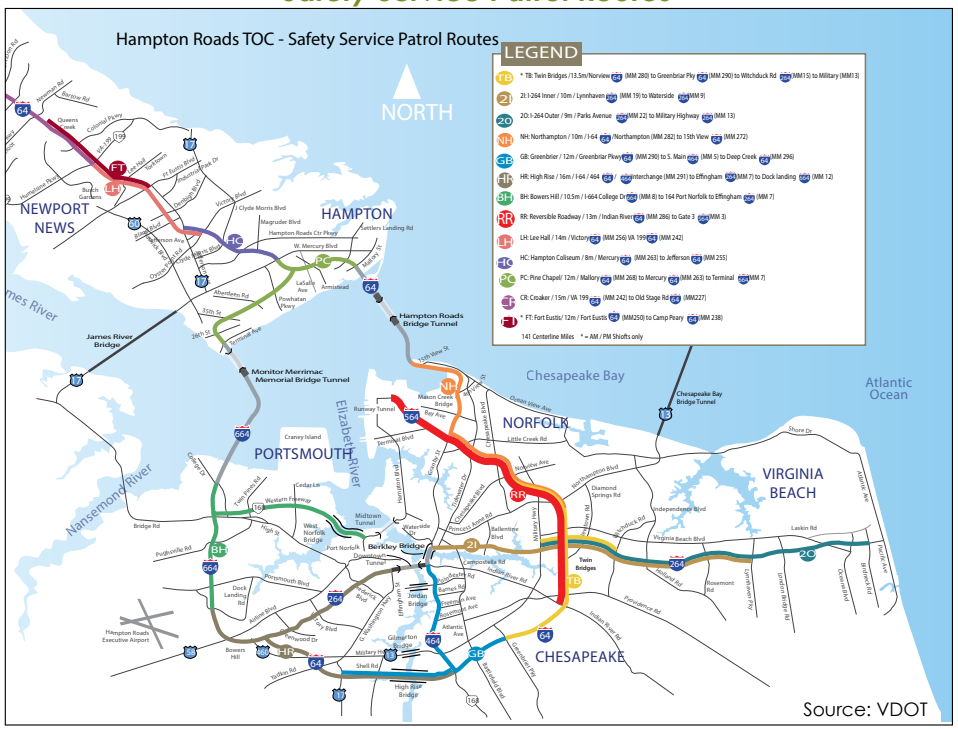
Hampton Roads Transportation Operations Center

Image Source: VDOT

Incident Management – Roadway travel can be made more reliable by identifying incidents (such as crashes, disabled vehicles, roadway debris, etc.) more quickly, improving response times, and managing incident scenes more effectively.

The Hampton Roads Transportation Operations Center oversees the Safety Service Patrol to handle incident management. The Safety Service Patrol covers 140 miles of the regional freeway system. Safety service patrol vehicles are also stationed at each tunnel facility to quickly respond to incidents.

Map 17: Hampton Roads Transportation Operations Center: Safety Service Patrol Routes



In 2018, the Hampton Roads Safety Service Patrol drove over 3 million miles and responded to over 45,000 incidents. The average incident duration time was 62 minutes.

Active Traffic Management – Active Traffic Management (ATM) is the integration of a set of operating strategies and technologies for managing traffic in a corridor. The system continuously monitors roadway conditions and uses automated tools to manage traffic conditions safely and optimize traffic flow. Technologies used in Active Traffic Management Systems include advanced lane control signal systems, queue warning systems, dynamic merge systems, adaptive ramp metering, and automated signage, including the ability to dynamically change speed limits.

ATM has started being deployed on corridors in the United States in recent years, including in the Seattle, Minneapolis, and San Francisco areas. An ATM system was installed by VDOT on I-66 in Northern Virginia in the mid-2010s. The system, however, was removed a few years later with construction on an Express Lanes network.

ATM on I-5 in Seattle, Washington

Norfolk Transportation Management Center

Arterial Management – In addition to VDOT's Hampton Roads Transportation Operations Center, most Hampton Roads localities maintain their own traffic management centers. These centers manage and operate local traffic signal systems, changeable message signs, and cameras. Data and video can also be shared from these centers.

Traveler Information – Travel time reliability can be improved by providing travelers with real-time information on roadway conditions. This information can include corridor travel times, the location of incidents, and advice on alternative routes.

In Hampton Roads, traveler information is provided via a number of platforms:

Changeable message signs

Changeable (or dynamic) message signs are electronic signs used on roadways to provide up-to-date information to the traveling public. These signs often display information related to corridor travel times, the location of incidents, lane closures, work zones, and backups at the tunnels.

The HRTOC operates over 200 changeable messages signs throughout the region. Several Hampton Roads jurisdictions also operate dozens of changeable message signs on local routes.

In addition, VDOT created the "Reach the Beach" initiative to provide information on the fastest routes to the Virginia Beach Oceanfront and to the Chesapeake Expressway for Outer Banks traffic. Real-time travel time

information is provided for two routes on each sign so travelers have the option of choosing the quicker route.

In 2012, VDOT installed and activated six signs in the region, and installed monitors with travel time information at Welcome Centers. Additional signs were installed in 2015, detailing travel times on I-64 and alternate routes to I-295 near Richmond from locations in Chesapeake, James City County, and Virginia Beach. Currently there are 16 permanent signs installed, with 9 in Hampton Roads and 7 in the Richmond area.

Highway Advisory Radio

Highway Advisory Radio provides up-to-date traveler information through radio broadcasts. In Hampton Roads, radio transmitters spread throughout the region broadcast traveler information on 1680 AM.

511 Virginia

Launched in 2005, 511 Virginia provides real-time traveler information via phone, email, Twitter, text message, smartphone app, and the http://www.511virginia.org website.

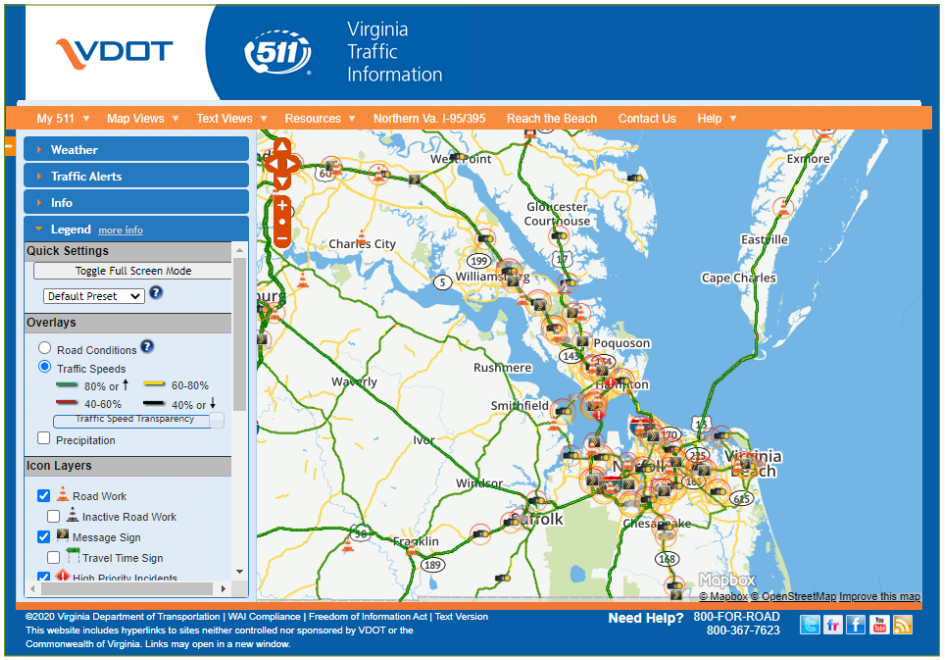
511 Virginia includes information on road conditions, traffic speeds, work zones, camera images, changeable sign messages, weather closures, truck parking, and incidents. Information is also provided on tourist destinations, rest areas, airports, ridesharing, and transit throughout Virginia. Customizable route information is also available.

In late 2017 VDOT released a major update to its 511 Virginia traveler information smartphone app. The app includes a list of travel times, maps, camera images, Reach the Beach information, weather information, truck parking availability, and the 511 Virginia Twitter feed. The recent update also includes turn-by-turn navigation via Waze as well as push notifications of traffic alerts.

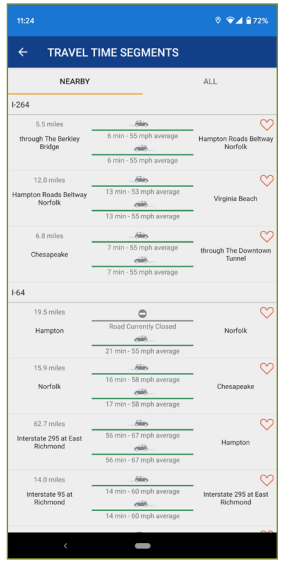
Private Sector

Traveler information is also provided on many platforms by private sector companies. Examples include Google and Bing Maps, INRIX, Waze (which is also available through the 511 Virginia website), and local radio and television stations.

Other Management Strategies – There are a number of other operational management strategies, such as work zone management, road weather



information systems, and planned special events traffic management. Each of these management strategies are in use by various agencies in Hampton Roads.



Regional Operations Committees – Operational improvements depend not only on the use of Intelligent Transportation Systems (ITS) technologies but also the use of trained, coordinated personnel. Two regional committees that assist with improving operations are the Hampton Roads Transportation Operations Subcommittee and the Regional Concept of Transportation Operations-Traffic Incident Management Working Group.

Hampton Roads Transportation Operations (HRTO) Subcommittee

The Hampton Roads Transportation Operations Subcommittee is dedicated to improving transportation operations in the region. The HRTO – a

subcommittee of the Transportation Technical Advisory Committee (TTAC) – is comprised of transportation professionals from Hampton Roads jurisdictions, VDOT, local transit agencies, the Virginia Port Authority (VPA), and other invited participants, such as local police and fire/EMS personnel.

When the HRTO Subcommittee (formerly known as the ITS Subcommittee) was formed, it was one of the first cooperative, inter-agency, multi-jurisdictional ITS groups in the nation. The accomplishments of the Hampton Roads ITS Subcommittee served as a model for the advancement of ITS throughout the country.

The HRTO Subcommittee has taken many actions to improve operations in the region. Some of these actions include:

Hampton Roads Regional Concept of Transportation Operations - Traffic Incident Management (RCTO-TIM) Working Group

In 2004, the HRTO Subcommittee initiated the development of a Regional Concept of Transportation Operations (RCTO), which is a tool that assists in planning and implementing transportation management and operations strategies in a collaborative and sustained manner. A regional training session was organized in Hampton Roads in May 2005 with representatives from FHWA presenting to the region's stakeholders the various components and benefits of an RCTO. While RCTOs can encompass a variety of transportation topics, "traffic incident management" was selected by local stakeholders as the primary focus for the Hampton Roads RCTO-TIM working group.

SOME ACCOMPLISHMENTS OF THE HAMPTON ROADS RCTO-TIM INCLUDE:

- BEGAN A PRACTICE OF COLLECTING AND ANALYZING TRAFFIC INCIDENT MANAGEMENT PERFORMANCE MEASUREMENT DATA.
- ANNUALLY PRODUCE PERFORMANCE MEASURE REPORTS TO TRACK PROGRESS TOWARD THE RCTO'S OPERATIONS OBJECTIVES.
- REGULARLY HOLDS POST-INCIDENT REVIEWS WITH KEY PARTICIPANTS TO DISCUSS "LESSONS LEARNED".
- DEVELOPED A STANDARD HAZMAT REPORTING DOCUMENT.
- PLANNED JOINT OUTREACH FOR THE "SLOW DOWN, MOVE OVER" LAW.
- WORKED TO OBTAIN THREE MORE TOTAL STATIONS TO BE UTILIZED BY VIRGINIA STATE POLICE IN FATAL INCIDENT INVESTIGATIONS IN ORDER TO REDUCE CLEARANCE TIMES.
- BEGAN CONSOLIDATING AND DISTRIBUTING REAL-TIME TRAFFIC INCIDENT INFORMATION GATHERED FROM DIFFERENT AGENCIES AND JURISDICTIONS TO LOCAL TRAFFIC MANAGEMENT CENTERS AND VDOT'S HAMPTON ROADS TRANSPORTATION OPERATIONS CENTER (TOC).
- DISTRIBUTED REVISIONS TO THE VIRGINIA WORK AREA PROTECTION MANUAL TO LOCAL FIRST RESPONDERS TO IMPROVE SAFETY FOR RESPONDERS AND THE TRAVELING PUBLIC.
- ADOPTED LANE DESIGNATION TERMINOLOGY TO LOCATE INCIDENTS FASTER AND REDUCE CLEARANCE TIMES.
- INSTALLED 2/10 MILE MARKER SIGNS AT VARIOUS LOCATIONS IN THE REGION TO ASSIST WITH IDENTIFYING INCIDENT LOCATIONS.
- OVER 7,000 EMERGENCY RESPONDERS HAVE BEEN TRAINED IN THE REGION SINCE 2011 USING THE STRATEGIC HIGHWAY RESEARCH PROGRAM 2 (SHRP2) NATIONAL TRAFFIC INCIDENT MANAGEMENT (TIM) RESPONDER TRAINING PROGRAM. VIRGINIA IS THE 2ND HIGHEST STATE IN THE U.S. FOR TIM TRAINING THROUGH THIS PROGRAM.

The RCTO-TIM working group, which is led by VDOT and meets on a regular basis, is comprised of various stakeholders from the Virginia State Police (VSP), local police, fire and rescue agencies, traffic engineers and planners, HRTPO staff, as well as other operators and first responders. The Hampton Roads RCTO-TIM was selected by the FHWA as one of four Demonstration Sites in the country and to serve as a model for other metropolitan regions.

The motivation for the Hampton Roads RCTO-TIM is to reduce the number of injuries incurred by responders, while decreasing the clearance times associated with these incidents, and to improve the operational coordination among those same responders.

Some accomplishments of the Hampton Roads RCTO-TIM include:

- Began a practice of collecting and analyzing traffic incident management performance measurement data.
- Annually produce performance measure reports to track progress toward the RCTO's operations objectives.
- Regularly holds post-incident reviews with key participants to discuss "lessons learned".
- Developed a standard hazmat reporting document.
- Planned joint outreach for the "Slow Down, Move Over" law.
- Worked to obtain three more total stations to be utilized by Virginia State Police in fatal incident investigations in order to reduce clearance times.
- Began consolidating and distributing real-time traffic incident information gathered from different agencies and jurisdictions to local traffic management centers and VDOT's Hampton Roads Transportation Operations Center (TOC).
- Distributed revisions to the Virginia Work Area Protection Manual to local first responders to improve safety for responders and the traveling public.
- Adopted Lane Designation Terminology to locate incidents faster and reduce clearance times.
- Installed 2/10 mile marker signs at various locations in the region to assist with identifying incident locations.
- Over 7,000 emergency responders have been trained in the region since 2011 using the Strategic Highway Research Program 2 (SHRP2) National Traffic Incident Management (TIM) Responder Training Program. Virginia is the 2nd highest state in the U.S. for TIM training through this program.

Safety Service Patrol

Future Operational Improvements – A number of technologies and operational strategies are under development that will completely transform how people travel and the transportation system, including Connected and Automated Vehicles. More details about challenges and strategies regarding Connected and Automated Vehicles can be found in the **Technology and the Future** section of this report.

COMMUTING

Many of the challenges related to roadway congestion and travel time reliability in Hampton Roads are caused by issues related to commuting. Although only 15-20% of trips are commuting-related according to the Census Bureau, nearly all of the recurring congestion in Hampton Roads occurs during the morning and afternoon peak travel periods.

The mean travel time to work in Hampton Roads was 25.0 minutes in 2018 according to data collected by the US Census Bureau through the American Community Survey (ACS). This number has increased through the years, up from 21.8 minutes in 1990, 24.1 minutes in 2000, and 23.7 minutes in 2010. The mean travel time to work has largely remained between 23 and 25 minutes throughout the 2000s.

Among the 39 large metropolitan areas throughout the United States with a population between one and four million people, Hampton Roads has a relatively low travel time to work, ranking 25th highest in 2018.

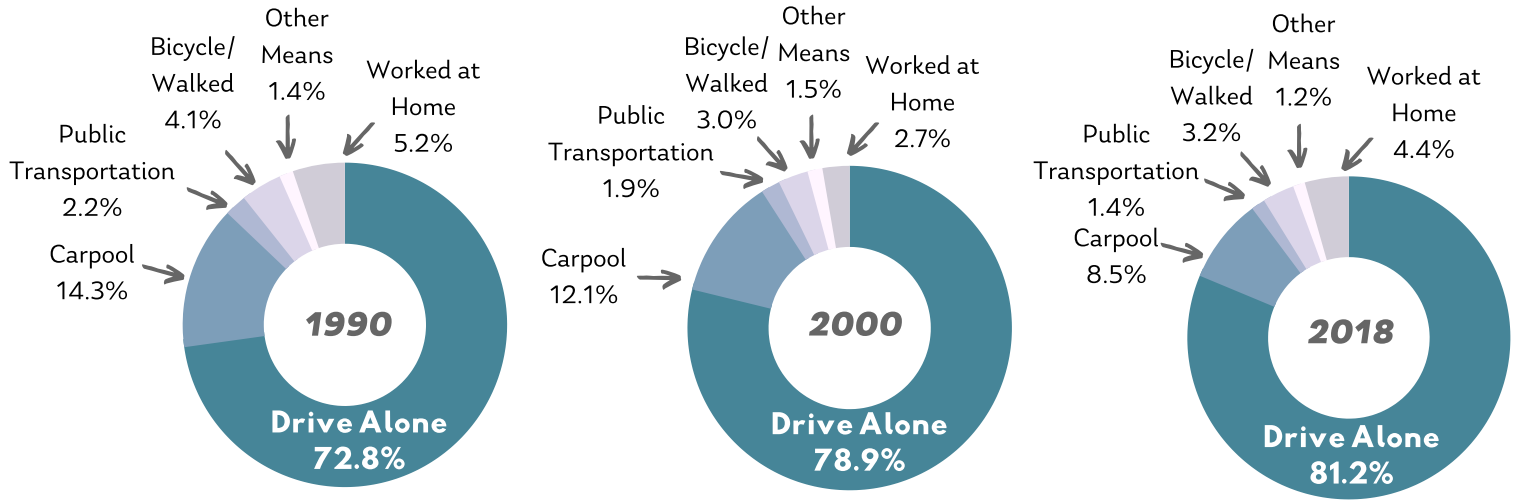
Many Hampton Roads residents, however, have much longer commutes. In 2018, more than one out of every three Hampton Roads commuters (36%) traveled 30 minutes or longer to work, and nearly 6% had commutes of an hour or more.

The percentage of commuters in Hampton Roads who drive alone to work has increased through the years. In 2018, 81% of commuters in Hampton Roads drove alone to work. This is up from 73% in 1990 and 79% in 2000, but has varied between 79% and 83% since 2000. In turn, the percentage of commuters carpooling to work decreased from 14% in 1990 to 12% in 2000 and to 9% in 2018.

The percentage of commuters driving alone to work in Hampton Roads is slightly higher than in other comparable areas. Hampton Roads ranked 15th highest among the 39 large metropolitan areas in terms of the percentage of commuters that drove alone to work in 2018, above the median of 80.3%.

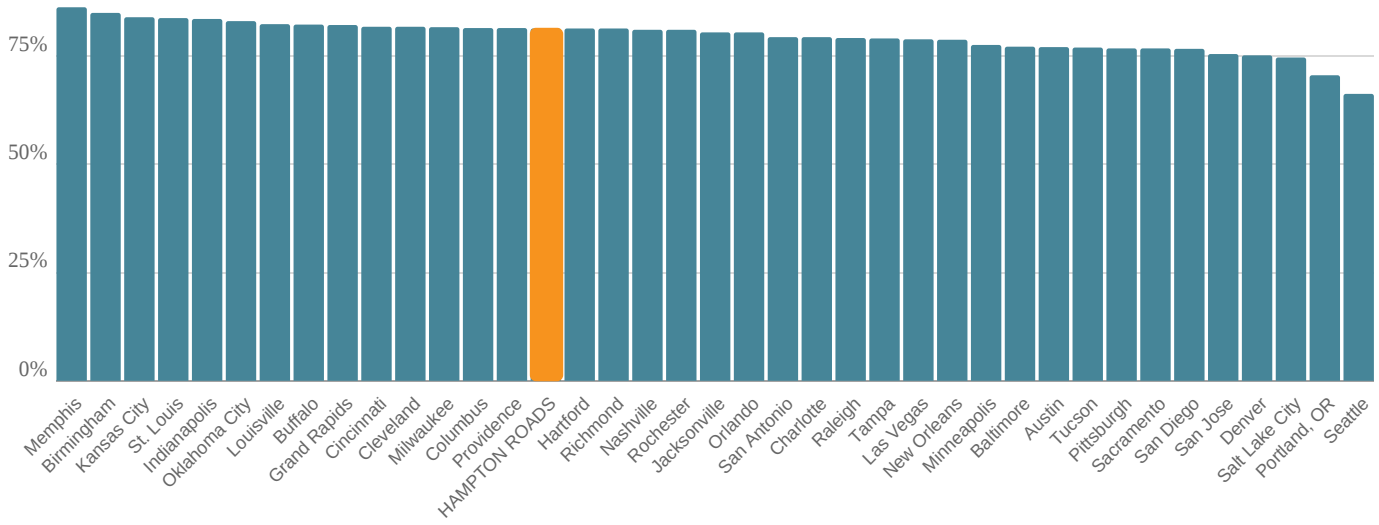
An area where Hampton Roads ranks particularly high is in the percentage of workers that work outside of their locality of residence. In 2018, 47% of all workers in Hampton Roads worked in a jurisdiction that was different than the one they resided in. This percentage is higher than that seen in 1990 (44%) but slightly lower than the percentage seen in 2000 (49%), and lower than the high that was experienced in 2005 (50%). The percentage in Hampton Roads is higher than the percentage seen in most other areas, ranking 3rd highest among the 39 large metropolitan areas with populations between one and four million people.

Figure 12: Commuting Methods in Hampton Roads



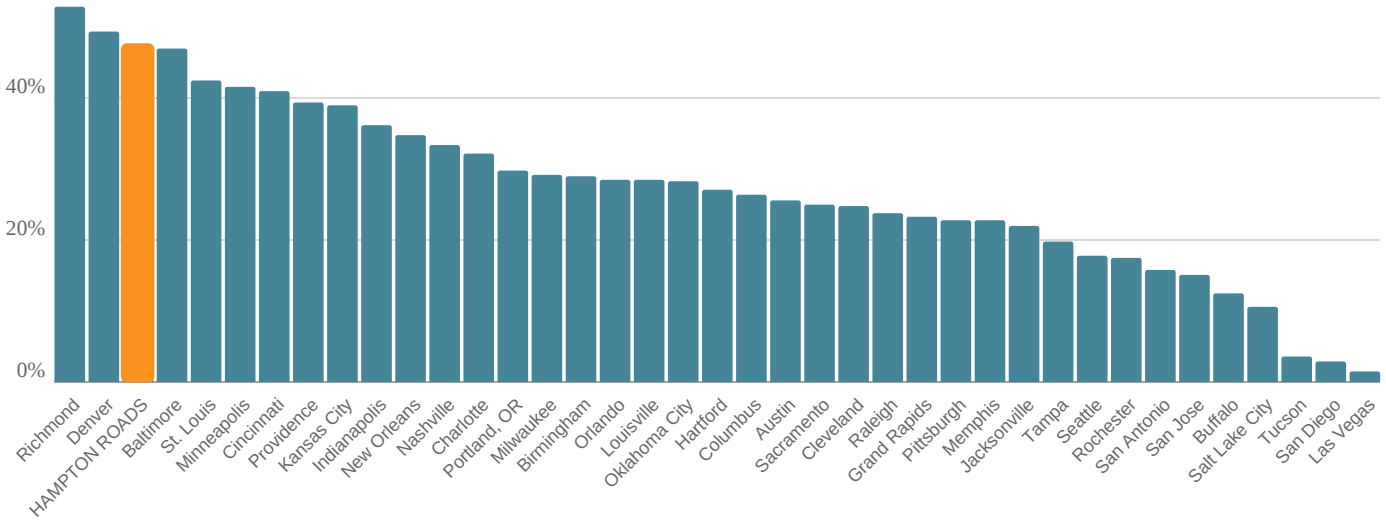
Data Source: US Census Bureau

Figure13 - Percentage of Commuters that Drove Alone to Work in Large Metrololitan Areas, 2018



Data Source: US Census Bureau

Figure 14: Percentage of Workers that Worked Outside County of Residence in Large Metropolitan Areas, 2018



Data Source: US Census Bureau

COMMUTING STRATEGIES

Transportation Demand Management (TDM) programs are designed to reduce traffic congestion and encourage alternatives to driving alone through a variety of mobility options, such as ridesharing, transit usage, telecommuting, and spreading out the peak period commuter traffic.

TRAFFIX is a cooperative public service, established in 1995, that implements TDM strategies in Hampton Roads by offering information and services on transportation alternatives to area commuters. Working with area employers and military installations, TRAFFIX helps implement parking management plans, the formation of carpools, vanpools, telework options and many more. TRAFFIX also offers guaranteed rides for commuters experiencing unexpected emergencies, and has a ride-matching and rewards program that provides discounts to area businesses for commuters who log their ride-sharing trips.

In 2018, TRAFFIX assisted nearly 12,000 registered commuters. According to TRAFFIX the program helped contribute to:

- Nearly 2,500 tons of total reduced CO2 emissions
- Over 5 million vehicle-miles not traveled
- More than 264,000 car trips eliminated
- Nearly 250,000 gallons of gas saved
- A reduction of $2.8 million in commuting expenses
- Nearly 5 million calories burned by walking or biking

TRAFFIX staff are employees of Hampton Roads Transit (HRT); however, funding is provided through the HRTPO. The HRTPO has authorized annual funding for TRAFFIX through Congestion Mitigation and Air Quality (CMAQ) and/or Regional Surface Transportation Program (RSTP) funding since 1995. The TRAFFIX Oversight Subcommittee (TOS), made up of transportation professionals from the cities and counties in the Metropolitan Planning Area (MPA), the Virginia Department of Transportation (VDOT), Federal Highway Administration (FHWA), U.S. Navy, and the Virginia Department of Rail and Public Transportation (DRPT), reviews the progress and status of TRAFFIX three times per year. The TOS reports to the Transportation Technical Advisory Committee (TTAC), which in turn reports to the HRTPO board.

TRAFFIX administers many programs internally and also advertises TDM programs administered by outside organizations. The Commuter Computer, Vanpool Program, Guaranteed Ride Program, and some park & ride lots are operated by TRAFFIX, while NuRide Rewards and Telework!VA are programs administered by other agencies which TRAFFIX promotes for Hampton Roads.

More information on Transportation Demand Management is available at http://hrtpo.org/page/transportation-demand-management, and more information on TRAFFIX is available at http://gotraffix.com.

TRAFFIX Vanpooling

PUBLIC TRANSPORTATION

Public transportation is a vital component of the Hampton Roads transportation system, both as a mode of transportation for those unable to drive and as a cost-effective alternative to driving alone in a single occupant vehicle.

Public transportation services in Hampton Roads are primarily provided by three agencies. The Williamsburg Area Transit Authority (WATA) provides transit service in James City County, Williamsburg, and northern York County, while Suffolk Transit provides transit service throughout that city. Hampton Roads Transit (HRT) provides service in the remaining urbanized areas on the Peninsula and Southside.

In addition, Senior Services of Southeastern Virginia operates I-Ride Transit, which provides fixed-route and medical transportation service in Norfolk, Portsmouth, Chesapeake, Virginia Beach, Franklin, Suffolk, Isle of Wight County, and Southampton County. Bay Transit provides fixed-route and dispatched service to rural residents throughout the Middle Peninsula and Northern Neck.

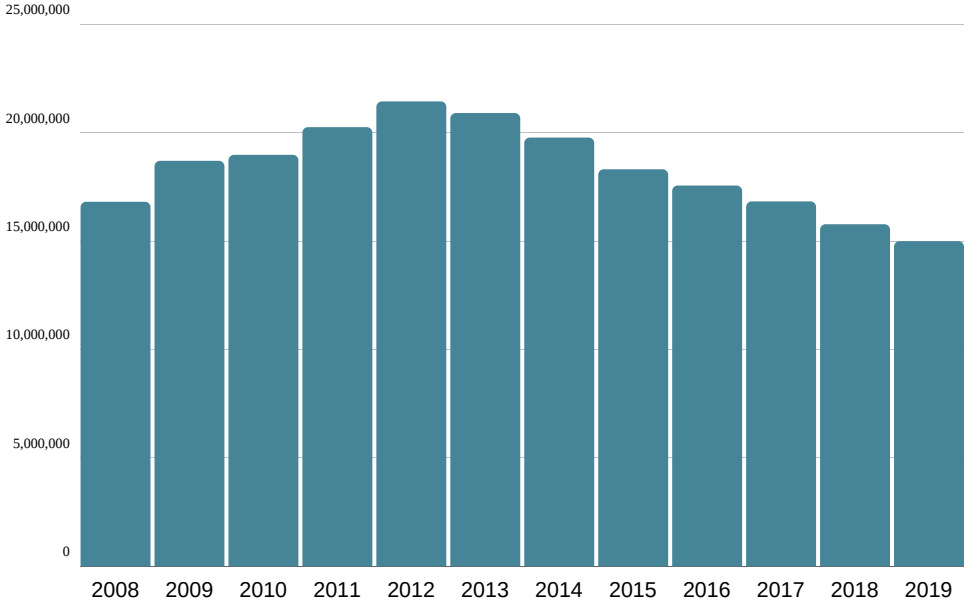
There were 15 million unlinked trips (number of passengers who board public transportation vehicles) taken on HRT, WATA, and Suffolk Transit public transportation services in Hampton Roads in 2018. This number includes ridership on regular and express buses, tourist-oriented services, light rail, demand response/paratransit, vanpools, and the passenger ferry.

The number of trips taken on public transportation in Hampton Roads increased significantly during the economic downturn, with a 28% increase in annual ridership levels from 2008 to 2012. However, ridership levels peaked in 2012 and have decreased each year since then. Ridership levels in 2019 were 20% below the levels seen in 2009 and were 30% below the peak levels seen in 2012.

The vast majority of public transportation trips in Hampton Roads – 86% in 2018 – are taken on regular or express bus service. Light rail comprised 11% of all HRT transit trips and 9% of all regional transit trips, and all other modes (including ferry, demand response/paratransit services, and vanpools) comprised the remaining 5%.

HRT Buses

Figure 15: Passenger Trips Taken on Public Transportation In Hampton Roads, 2008-2019



Data Sources: HRT, WATA, Suffolk, American Public Transportation Association

Public transportation usage in Hampton Roads lags behind other metropolitan areas. At 9.1 passenger trips on public transportation per capita in 2018, Hampton Roads ranked 28th highest among the 39 large metropolitan areas with populations between one and four million people. Metropolitan areas such as Seattle, Portland, Salt Lake City, Denver and Baltimore, have transit usage rates per capita more than four times higher than Hampton Roads.

A common challenge for transit providers is obtaining funding for operating and capital expenses. Passenger fares only cover a portion of each transit system's operating costs for most agencies. This means that agencies are often directed to seek additional funding from local, state, and federal sources.

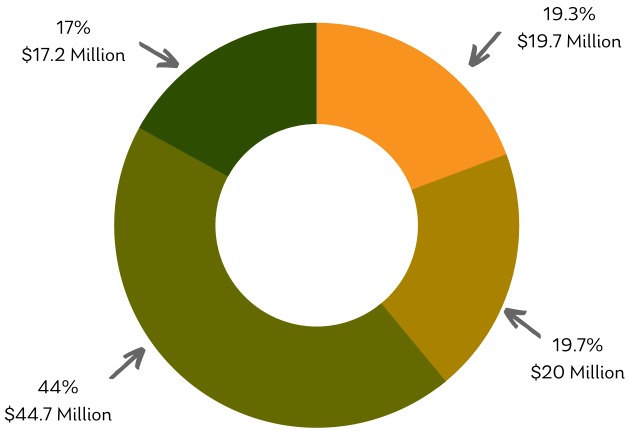
In 2020, legislation passed giving HRT dedicated funding for a core transit network via the Hampton Roads Transportation Accountability Commission. Dedicated funding sources comprise the largest share of transit operating revenue in agencies across the United States (Figure 16).

Less money has been spent on public transportation in Hampton Roads than many other areas. According to an analysis of the National Transit Database, $67 was spent per capita on transit operating and capital expenses in Hampton Roads in Reporting Year 2017. This ranked Hampton Roads 30th highest among the 39 large metropolitan areas with populations between one and four million people. Metropolitan areas including Seattle, Baltimore, San Jose, Denver, and Salt Lake City spent more than five times per capita on transit than was spent in Hampton Roads.

This level of spending on transit in Hampton Roads also contributes to an aging vehicle fleet. The average age of HRT buses is 10 years as of 2019, which is four years beyond FTA's recommended average fleet age. However, HRT is planning to replace nearly half of its entire fleet of buses by 2023, which should lower the average age of HRT's bus fleet down to 7 years. Much of WATA's fleet has been replaced in recent years, including six new buses in 2019. WATA's bus fleet has decreased in age from an average of 10 years in 2015 down to 6 years currently.

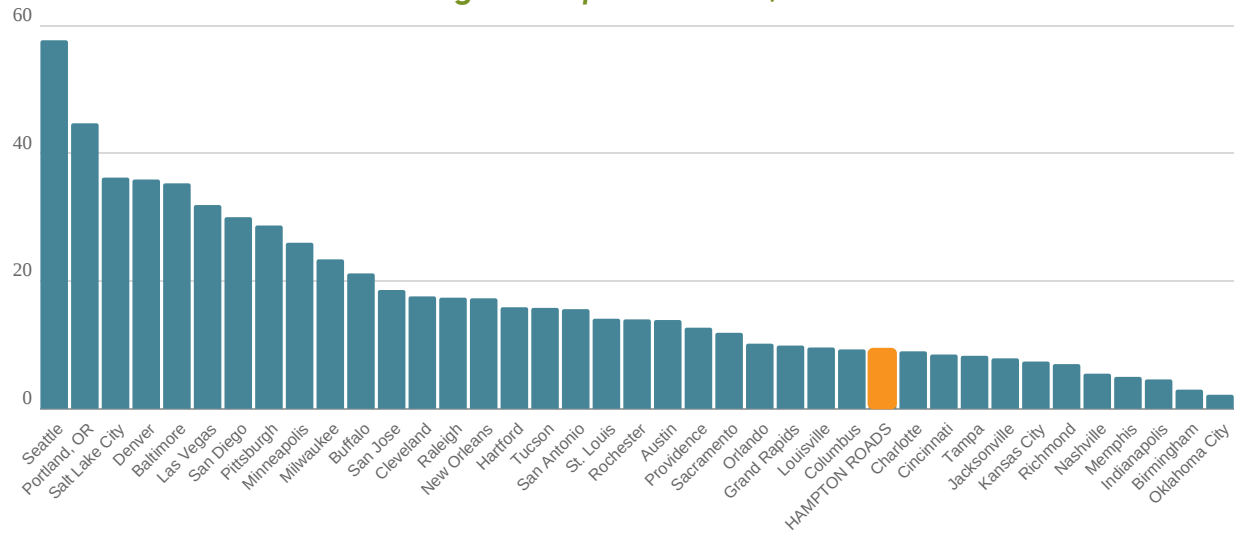
Transit buses are older in Hampton Roads than in other comparable metropolitan areas. Among large metropolitan areas throughout the country with populations between one and four million people, the median age of transit buses was 6.3 years in Reporting Year 2017 according to the National Transit Database. Only San Jose, Buffalo, and Charlotte had an average transit bus age that was older than the bus fleet in Hampton Roads.

Figure 16: HRT Funding Operations



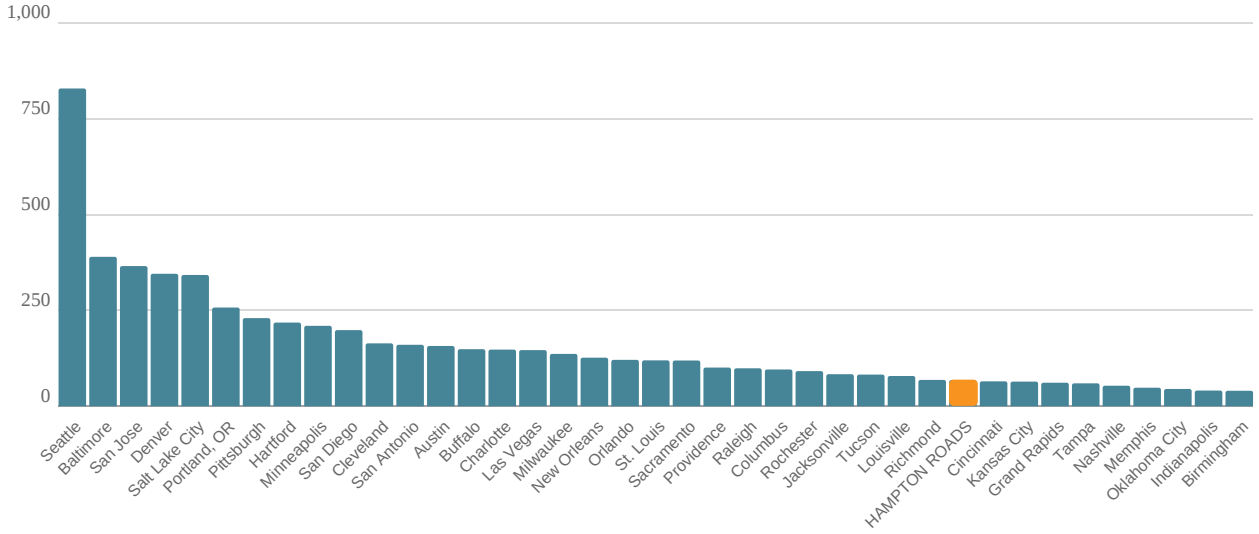
Data Source: HRT

Figure 17: Passenger Trips Per Capita on Public Transportation in Large Metropolitan Areas, 2018



Sources: HRT, WATA, APTA, Census Bureau

Figure 18: Transit Operating and Capital Expenses Per Capita In Large Metropolitan Areas, 2018



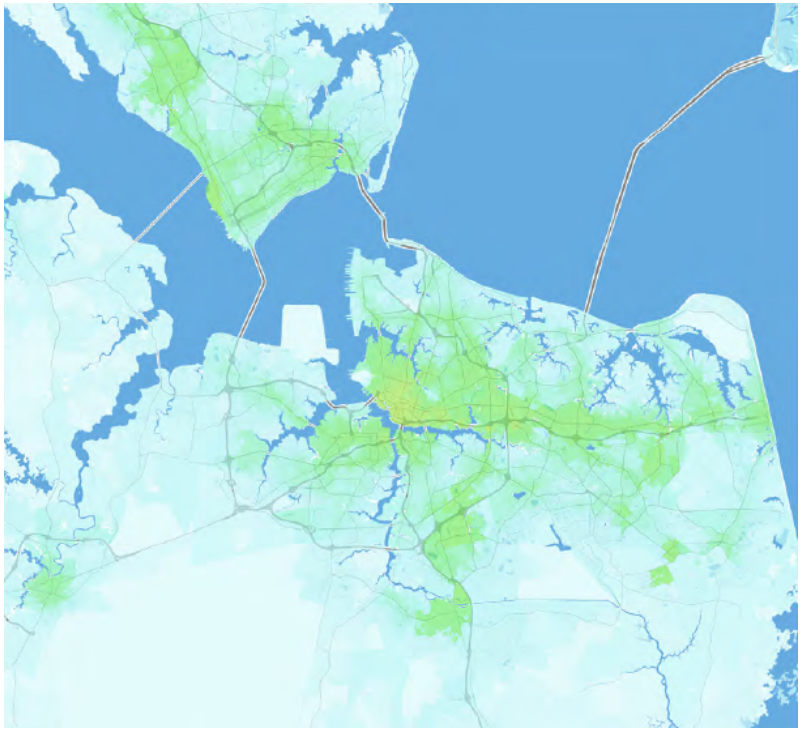
Sources: National Transit Database, Census Bureau

Service coverage and frequency are important aspects of the desirability of a given transit system. As of 2015, it is estimated that approximately 60% of the Hampton Roads population lived within a half-mile of a transit stop (Figure 19 and Map 19). Transit coverage has not changed significantly since that time.

Another essential component of public transportation is providing access to jobs. Accessibility is the ease and feasibility of reaching destinations, and it combines mobility with the understanding that travel is driven by a desire to reach destinations. In 2015, its estimated that over 70% of employment is located within a half-mile of transit stops (shown in Map 20).

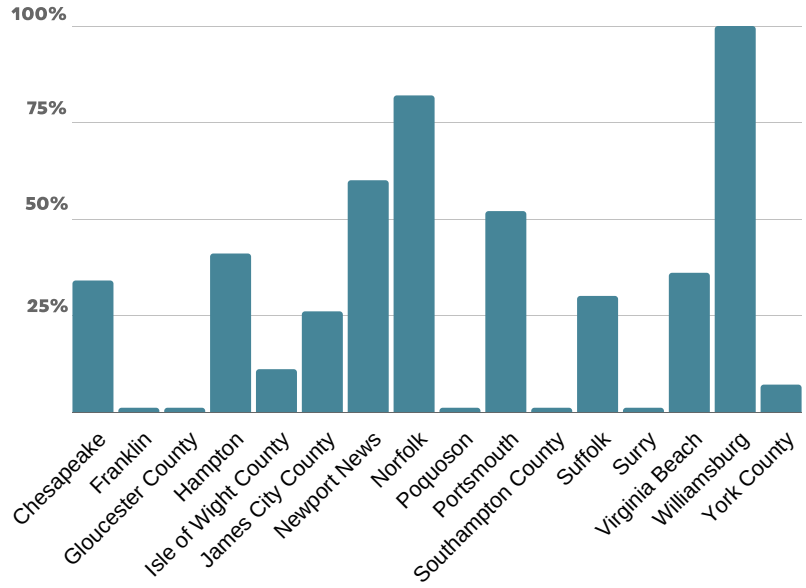
In 2017, the University of Minnesota produced the Access Across America report, which found that less than 1% of all jobs are reachable within 30 minutes by public transportation, and less than 5% of all jobs are reachable within 60 minutes by public transportation. Map 18 shows the accessibility of jobs within 30 minutes by public transportation in Hampton Roads.

Map 18: Number of Jobs within 30 Minutes by Transit in Hampton Roads, 2017



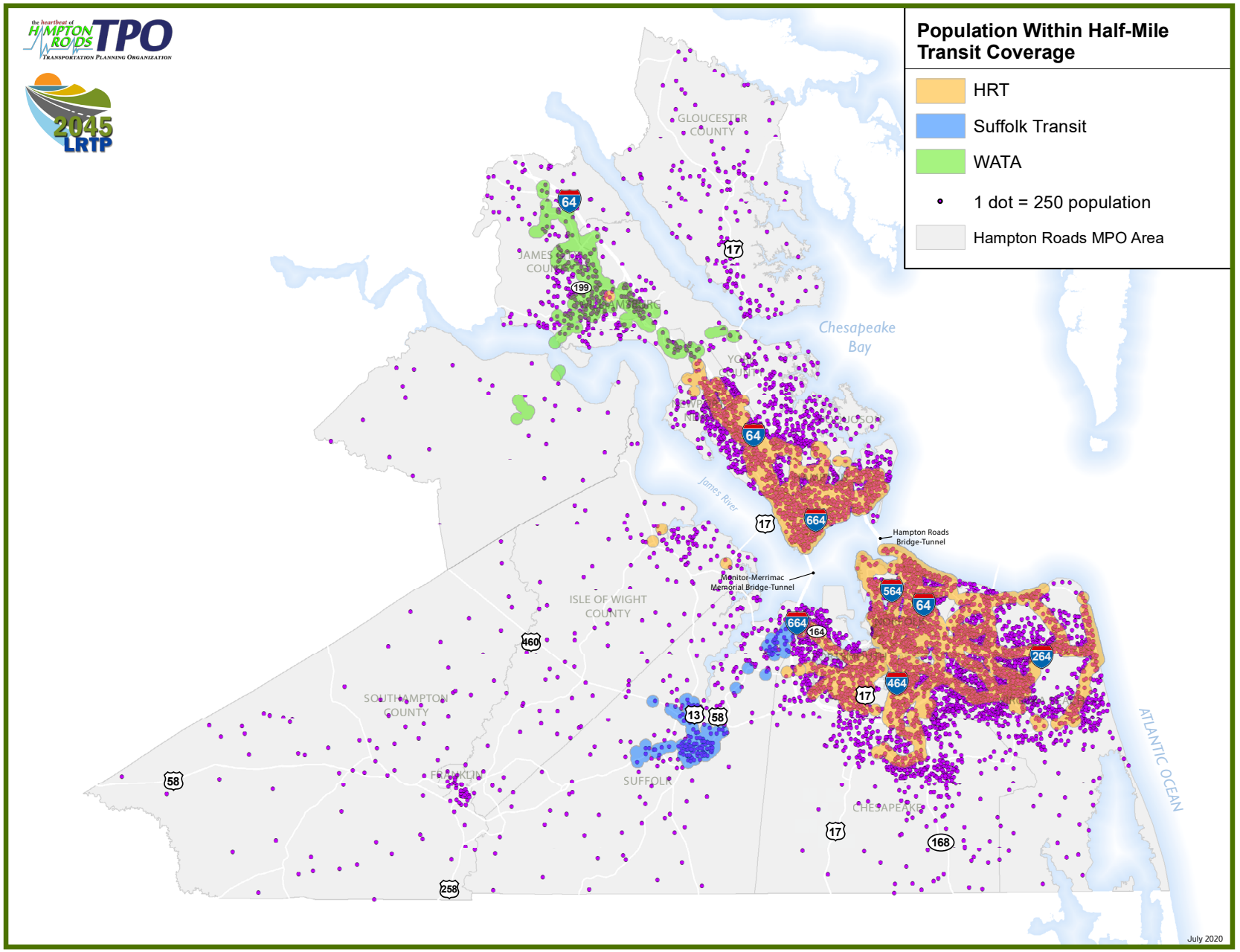
Source: University of Minneosta

Figure 19: Transit Population Coverage By Locality, 2015



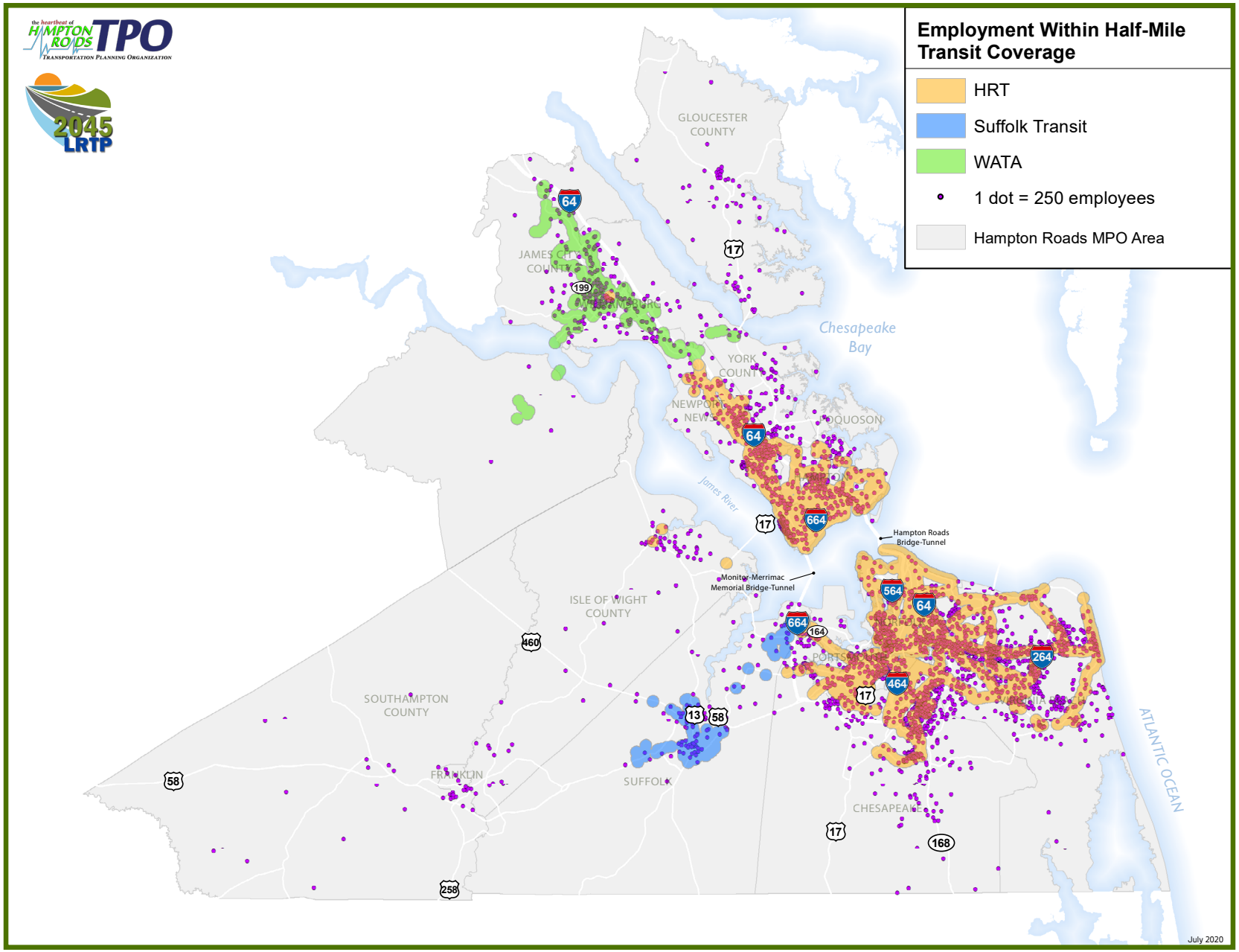
Data Sources: ESRI Business Analyst, HRT, WATA, Suffolk Transit

Map 19: Population Within a Half-Mile of Transit Coverage



Sources: HRT, WATA, Suffolk Transit, ESRI Business Analyst

Map 20: Employment Within a Half-Mile of Transit Coverage



Sources: HRT, WATA, Suffolk Transit, ESRI Business Analyst

STRATEGIES FOR IMPROVEMENT

Several efforts have identified ways to improve public transit in Hampton Roads.

Transit Vision Plan

The current vision plan (*Hampton Roads Regional Transit Vision Plan* by DRPT, HRT, WATA, Feb. 2011) provides a concept for a regional rapid transit network that connects major employment and population centers:

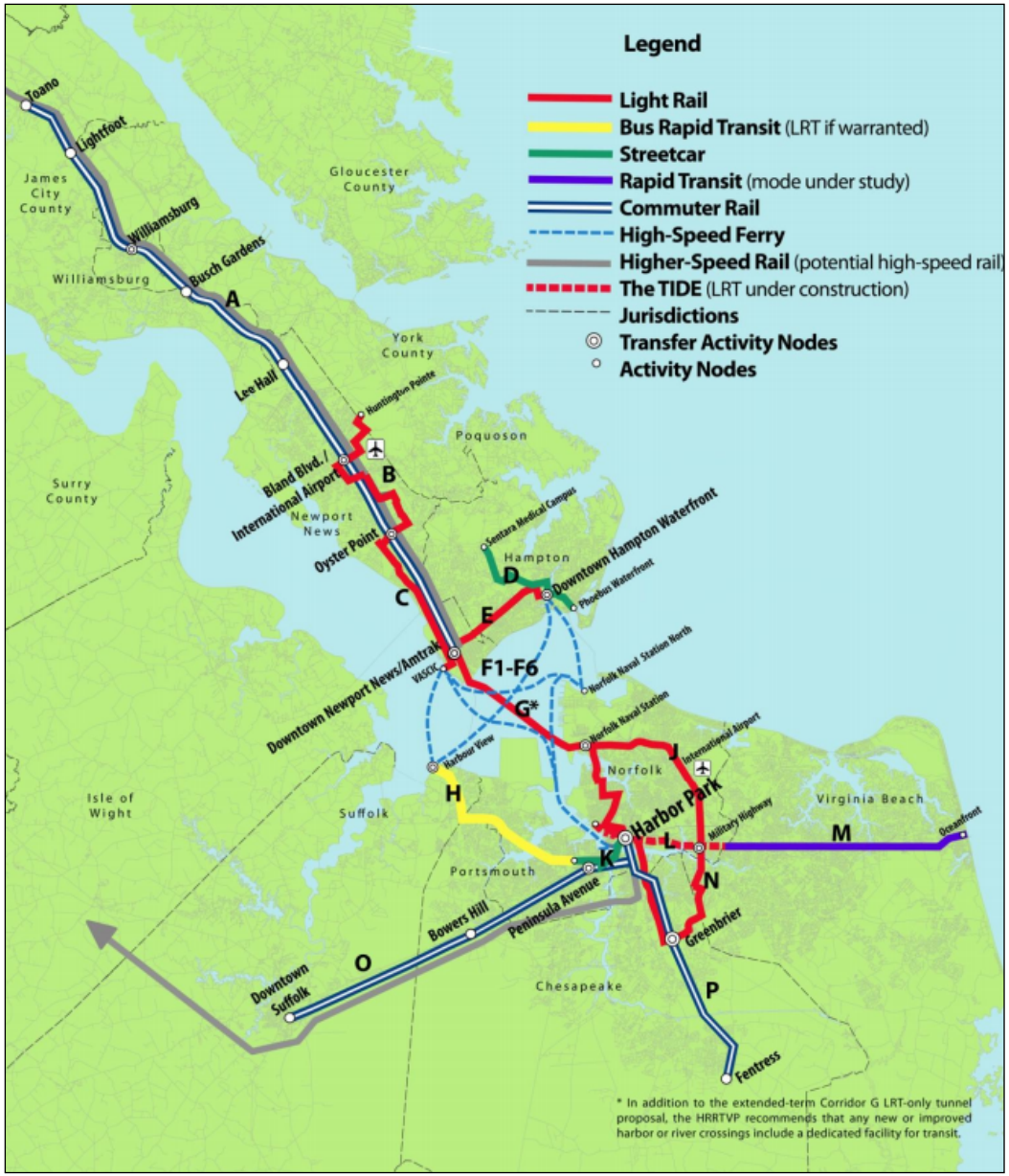
> "An integrated public transit network will provide Hampton Roads with transportation choices, thereby ensuring greater mobility, economic development, environmental protection, energy independence, and quality of life."

The following rapid transit modes are included in the plan:

- Light Rail Transit (LRT)
- Commuter Rail
- Enhanced Bus
- Express Bus
- Bus Rapid Transit (BRT)
- High-Speed Ferry

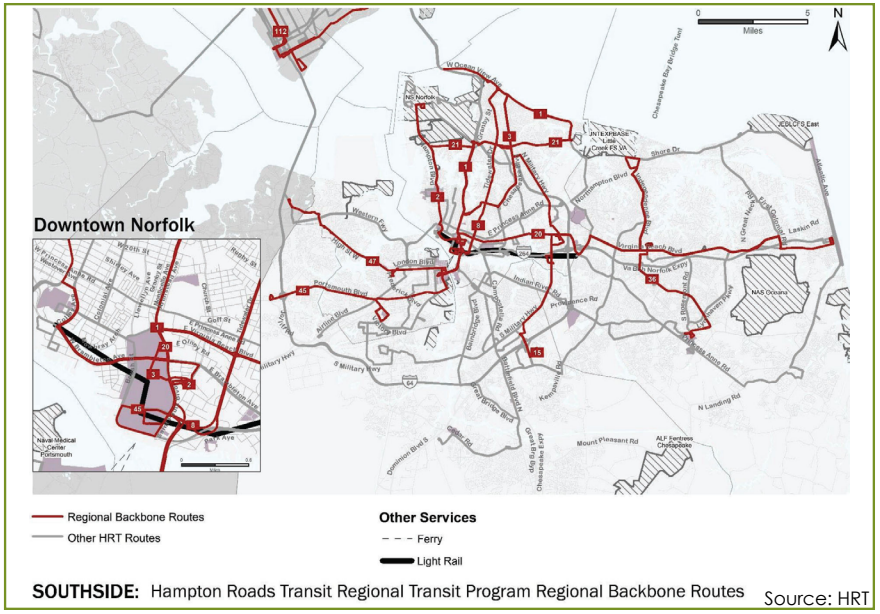
As stated in the report, the Hampton Roads harbor presents a challenge to linking the Peninsula and Southside. However, it also gives regional transit agencies an opportunity to introduce new services that can serve this need and relieve congestion, such as high-speed ferries and a dedicated tunnel facility for rapid transit.

Map 21: 2011 Transit Vision Plan Map for Hampton Roads

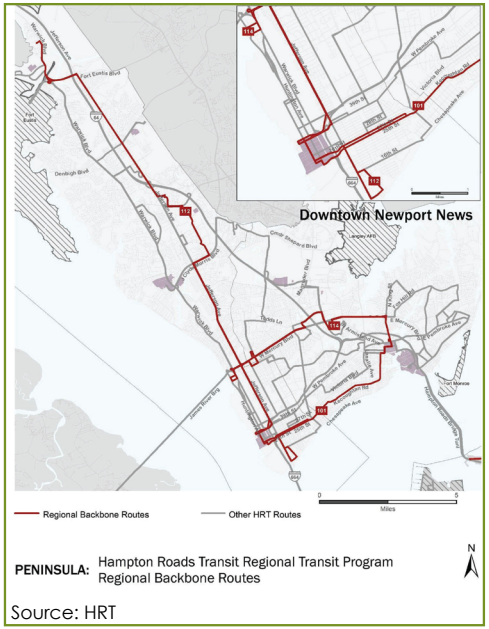


Source: Hampton Roads Regional Transit Vision Plan

Map 22: Proposed Backbone Bus Routes - Southside



Map 23: Proposed Backbone Bus Routes - Peninsula



HRT's Transit Transformation Project

As of early 2020, HRT is developing a strategic planning process known as the Transit Transformation Project. According to the project website:

- The Transit Transformation Project is an opportunity shape the future with more efficient and effective bus transit to serve the region better.
- With today's new technologies and transportation options, it's more important than ever that core bus service is a dependable and integrated part of the region's mobility ecosystem. It's time to take a fresh look at the design and performance of our system. In doing so, we can determine how a re-designed bus network could improve service to serve more people more effectively.

According to the November 14, 2019 presentation to the HRT board, two versions of service plan were developed:

- Full Plan – Standards applied consistently everywhere; 21% more service than today
- Cost Neutral Plan – less frequency on some routes than full plan; 1.5% more service than today

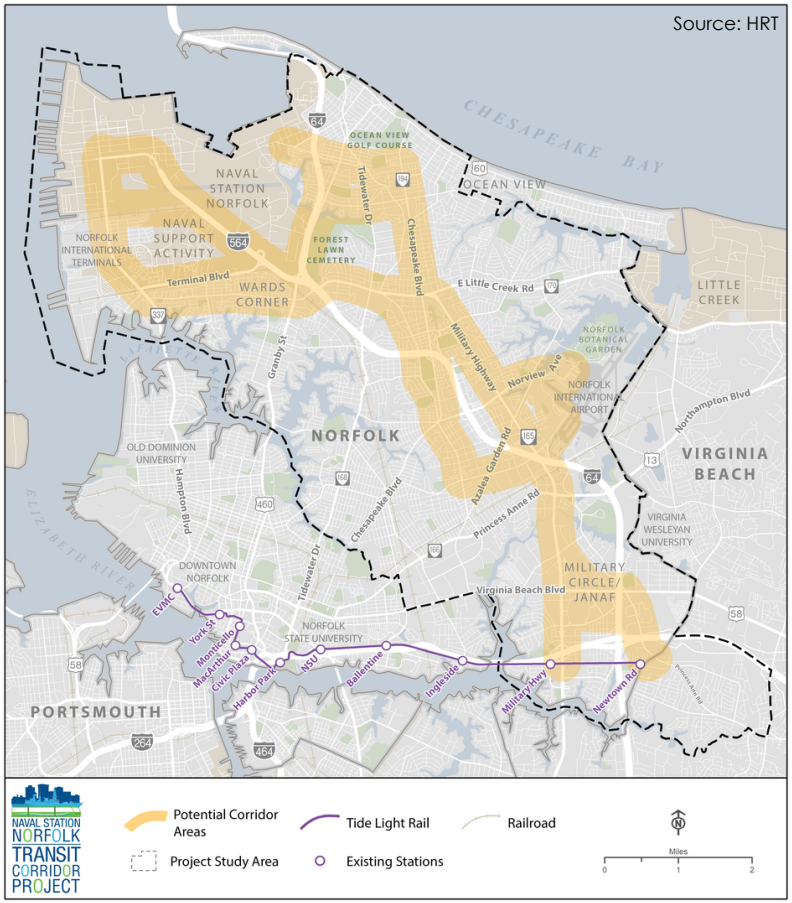
Benefits of the cost neutral plan:

- Simpler: 54 routes consolidated into 42 routes
- Covers more ground: +6% area within walking distance
- Serves more people: +11% people within walking distance
- Serves more jobs: +10% jobs within walking distance
- Routes with 15-minute service nearly double
- Population within walking distance of 15-min service doubles
- Employment within walking distance of 15-min service almost doubles
- Model predicts weekday ridership could increase by 19%

The project includes a "backbone" of bus transit, providing a core and connected regional network of inter-jurisdictional, high-frequency bus routes. HRT's "*Transit Strategic Plan*" (June 2020) proposes 13 regional backbone routes (Maps 22 and 23) which would operate on 15 minute headways during the a.m. and p.m. peak periods (weekdays), and on 30 minute headways during other periods. The weekday span of service would be 5am to 1am, 6am to midnight on weekends.

In its 2020 session, the General Assembly passed legislation providing funds for the HRT backbone.

	Frequency	Span of Service
Regional Backbone	Weekday peak: 15 minutes Other Times: 30 minutes	Weekdays: 5AM to 1AM Weekends: 6AM to Midnight



Map 24: Potential High Capacity Transit

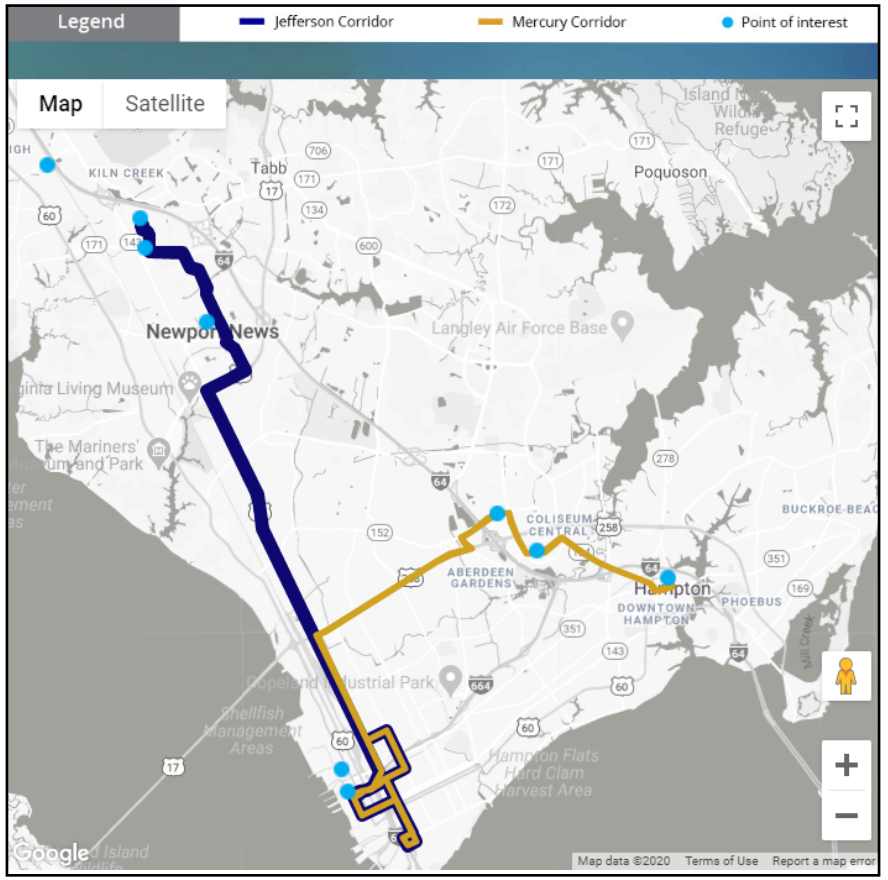
HRT Fixed Guideway Expansion Studies

Light rail service began in Norfolk in 2011. HRT is currently conducting two fixed guideway expansion studies. The ***Naval Station Norfolk Transit Extension Study*** is examining potential high capacity transit methods "to establish high-capacity transit on the east side of the City of Norfolk between the existing Tide Light Rail system and Naval Station Norfolk." (www.navalstationnorfolktransit.com)

In addition, HRT and the Cities of Hampton and Newport News are proposing a bus rapid transit (BRT) system that would link many popular destinations of the two cities. (www.peninsulabrt.com)

In order for the project to be eligible for federal funds, the Peninsula BRT project will further define corridor alternatives and an environmental review will be completed under the National Environmental Policy Act (NEPA). The NEPA process is expected to conclude in 2020.

Map 25: Proposed BRT line in Hampton and Newport News



Transit Development Plans

The Virginia Department of Rail and Public Transportation (DRPT) requires every public transit agency in the Commonwealth to develop a Transit Development Plan (TDP) every ten years. TDPs help transit operators improve their efficiency and effectiveness by identifying the need and required resources for modifying and enhancing services provided to the general public and also help operators effectively execute planning, funding, and implementation of public transit services.

- HRT *Transit Strategic Plan* FY 2021 – FY 2030
- WATA *Transit Development Plan* FY 2017 – FY 2022
- Suffolk Transit *Transit Strategic Plan* FY 2020 - FY 2029

In the Suffolk Transit *Transit Strategic Plan*:

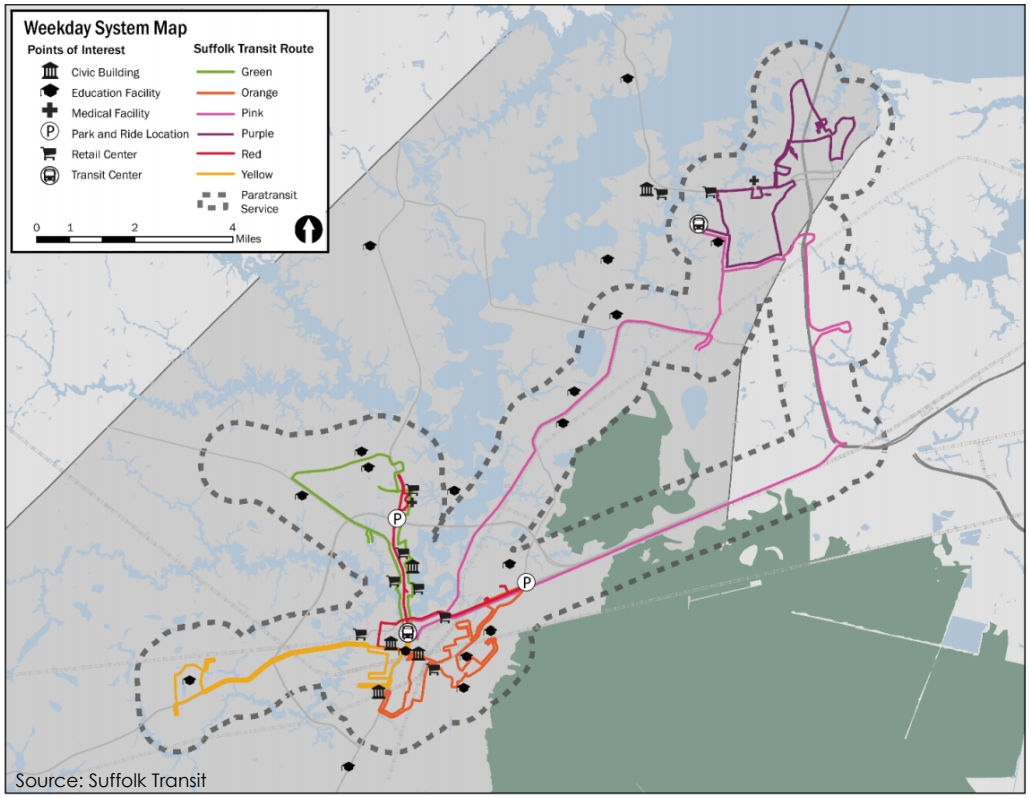
"Suffolk Transit proposes…the implementation of two new fixed routes (i.e., the Blue route and the Lunch Circulator), and the introduction of commuter and on-demand service."

"The proposed service changes are expected to result in a 77 percent increase in ridership on fixed-route service during weekdays and a 74 percent increase in ridership on Saturday."

HRTPO Planning Efforts

Staff is forming the Regional Transit Advisory Panel and (TTAC subcommittee) Public Transit Working Group which may review and comment on:

- Identification of backbone routes
- Design of service (e.g. hours, frequency)
- Allocation of new funds



Map 26: Suffolk Transit Weekday System Map

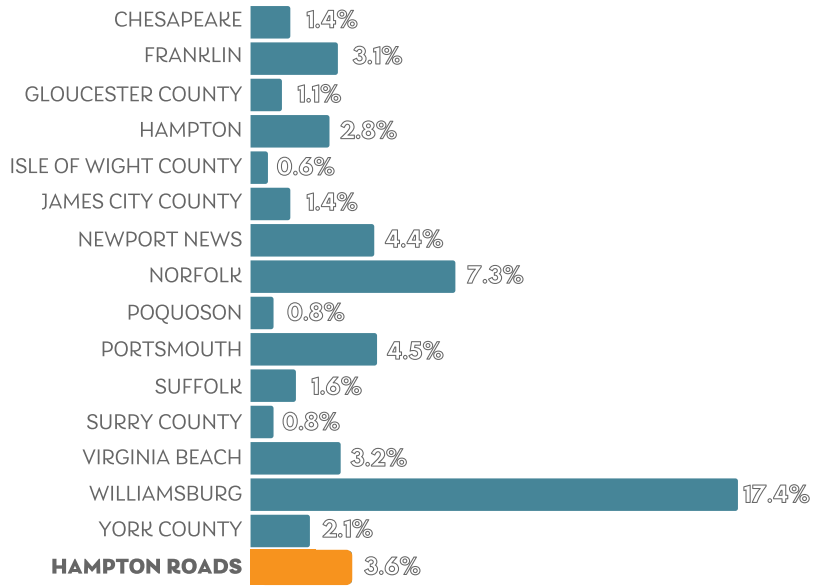
ACTIVE TRANSPORTATION

Active Transportation, defined as all forms of human-powered transportation, has become a more prominent mode of transportation, both in Hampton Roads and throughout the country. Active Transportation provides an alternative transportation choice, of which biking and walking are the most common, provides a necessary link to transit while also contributing to a healthy, active lifestyle.

Commute Mode Share

At 3.5%, the Active Transportation (walking and biking combined) commute mode share (how employees travel to work) in the Hampton Roads region is higher than the state average of 2.8%. The Southside region had an average rate of 3.5% compared to the Peninsula region average rate of 3.4%. The City of Williamsburg has the highest percentage (17.4%), over six times that of the state rate. As shown on Map 27, the areas with the highest percentage of Active Transportation commuting are in urban areas and on military bases. The commute mode share rate average for each locality is shown in Figure 20.

Figure 20: Regional Active Transportation Commute Mode Share, 2016



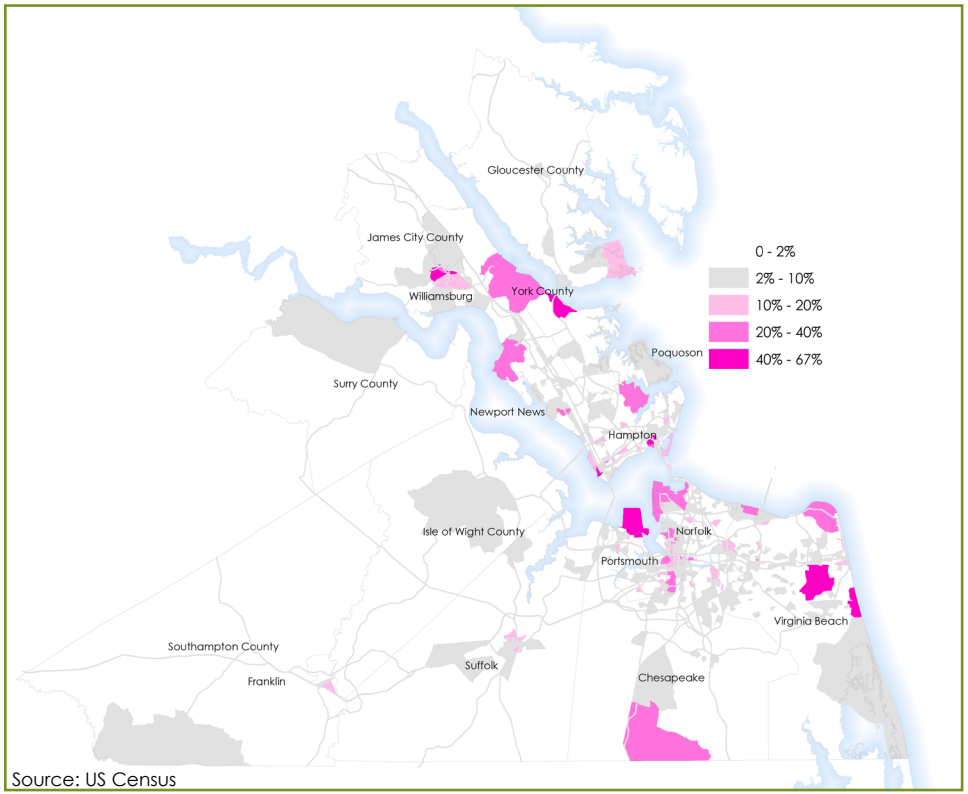
Data Source: American Community Survey

These non-motorized commuters use over 1,300 miles of shared use paths, bike lanes, paved shoulders, sidewalks, signed shared roadways, shared roadways and trails that compose the bicycle and pedestrian network across Hampton Roads (as shown on Maps 28 and 29 on page 47).

Existing Active Transportation Facilities

Both the Peninsula and Southside regions include major eco-tourism destinations, military bases, and employment centers. On the Peninsula, the Historical Triangle is home to tourism, shopping, and major universities that provides an active area for biking and walking. The Historic Triangle also boasts the terminus for both the Virginia Capital Trail and the future Birthplace of America Trail. Downtown Hampton, Phoebus, and Fort Monroe also provide attractive destinations in which to live, work and play Newport News and Hampton boast key major employers, population centers, and tourist destinations.

Map 27: Regional Active Transportation Commute Mode Share



Source: US Census

Key destinations on the Southside are dispersed throughout the region. In Norfolk, critical companies, including port and defense-related industries, fuel our regional economy. The Virginia Beach Oceanfront proudly maintains a boardwalk and bike lanes with breathtaking views of the ocean. Employment and population centers also dot the City as major destinations to connect via active transportation. Portsmouth has many charming, historic neighborhoods including Olde Towne, that are ideal for walking and biking.

Other key Southside eco-tourist destinations include the Dismal Swamp, branches of the Elizabeth River, and the Nansemond River. In Chesapeake, the City has connected a decommissioned roadway and turned it into the Dismal Swamp Canal Trail. In Suffolk, the City has been turning former rail right-of-way into trails as part of the South Hampton Roads Trail. The rural counties of Hampton Roads, Gloucester, Isle of Wight, and Surry, all promote active transportation as an important part of their planning process and infrastructure.

The following map series were produced by HRTPO staff during the development of the Linking Hampton Roads regional active transportation plan.

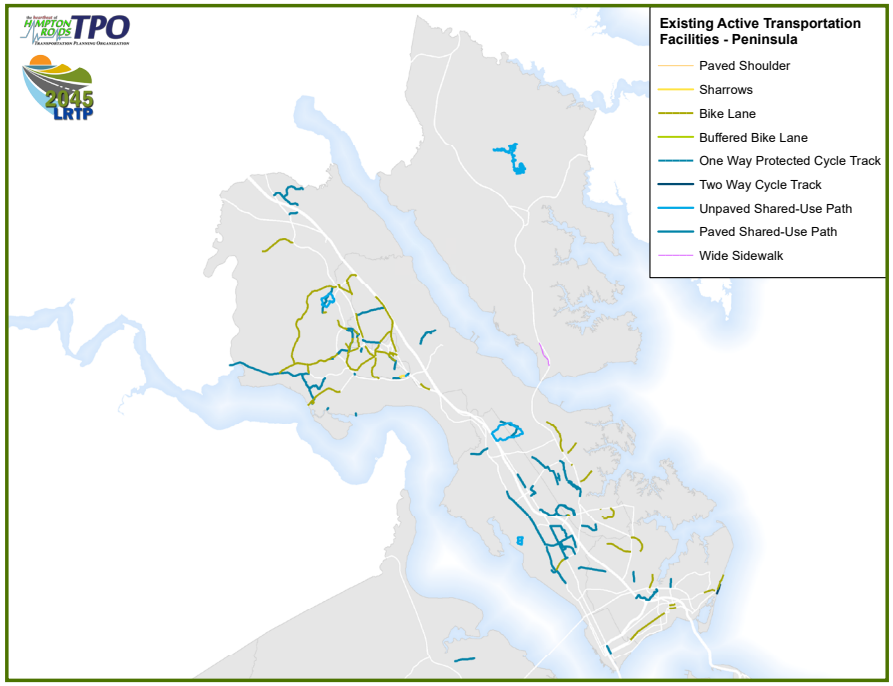
Although the region contains miles of active transportation facilities, users still face many challenges including network gaps and a lack of support facilities. These challenges reduce the potential accessibility of non-motorized transportation users to this non-motorized network of facilities.

Active Transportation Crash Analysis

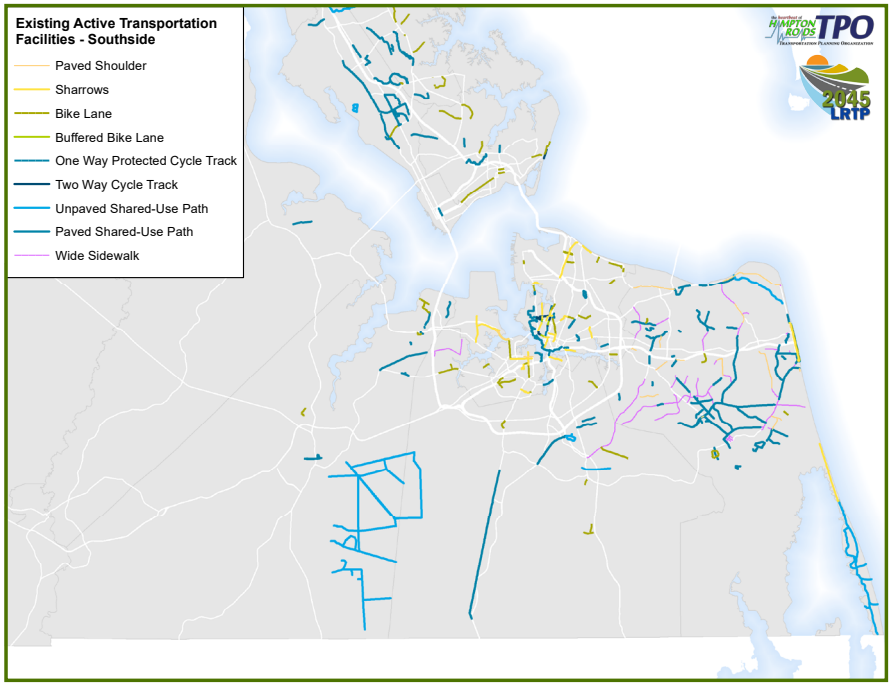
Another challenge users face is safety. Using data from Virginia's Department of Motor Vehicles, HRTPO staff analyzed safety trends and crash patterns in the region as part of the *Linking Hampton Roads* study.

Map 30 shows active transportation crashes in the region between 2012 and 2016 (density of crashes is per census tract). Four areas stand out as high crash areas:

- Virginia Beach Oceanfront
- Newport News
- Hampton
- Williamsburg



Map 28: Active Transportation Facilities - Peninsula



Map 29: Active Transportation Facilities - Southside

Although these areas differ in terms of quality active transportation infrastructure, commute mode share, land use, and urban setting, a common theme among these areas is a high amount of bicycle and pedestrian traffic.

STRATEGIES FOR IMPROVING ACTIVE TRANSPORTATION

State, Regional, and Local Planning

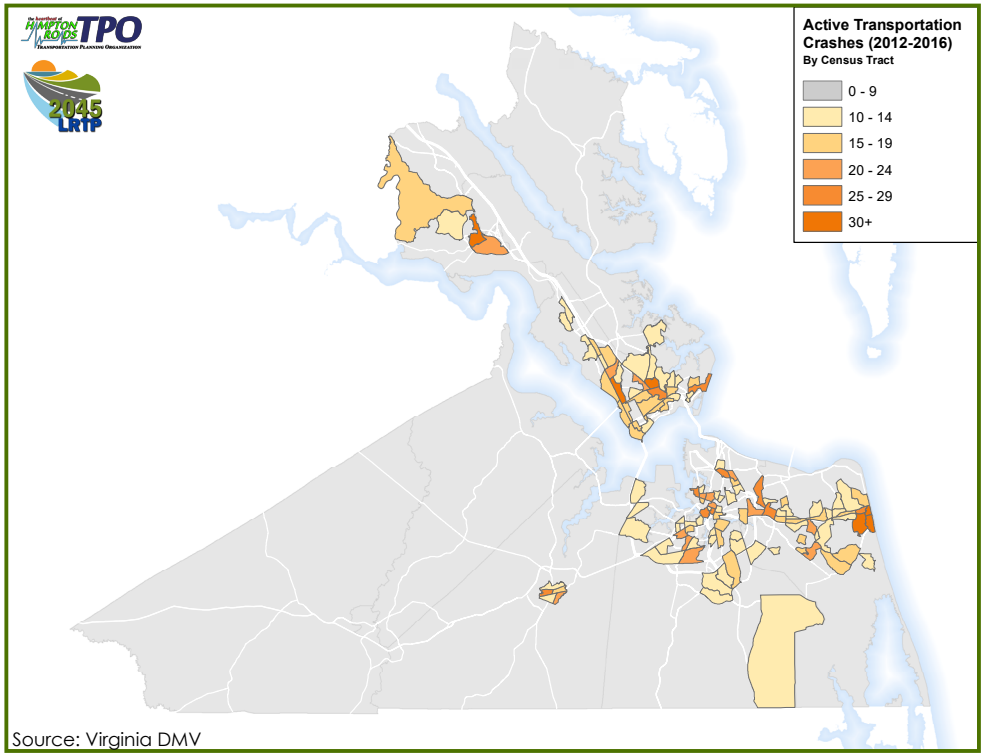
There are multiple ongoing efforts within the region to improve both the connectivity and safety of bicycle and pedestrian facilities.

The *State Bicycle Policy Plan* of VDOT establishes a framework for creating and maintaining a transportation system that provides necessary infrastructure for bicyclists. The plan provides policy recommendations that guide the planning, design, construction, operation, and maintenance of bicycle accommodations.

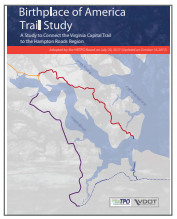
In 2017, the HRTPO began developing a regional active transportation plan for the Hampton Roads region, *Linking Hampton Roads*. The purpose of this regional plan is to provide a clear structure for the development of new facilities, programs, and policies that will link our region by developing greater active transportation facilities and promote active and healthy lifestyles throughout the region.

Many existing plans for localities in the Hampton Roads region contain recommendations pertinent to active transportation. Finding and recommendations from these plans help to improve the overall regional network.

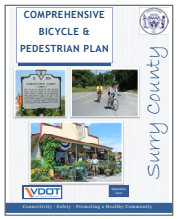
A couple of examples from these plans include the Bike Walk Hampton Plan. In Hampton, the City is working on expanding its network of active transportation facilities to include connecting the newly decommissioned Fort Monroe, which is now a new destination for living and recreation, to the rest of the city. The City of Norfolk has been a leader in active transportation development in the region with its Elizabeth River Trail and pilot bike loop which includes the areas only one-way and two-way protected cycle tracks. Also, the City of Williamsburg has recently opened a new two-way protected bike lane on Monticello Avenue.



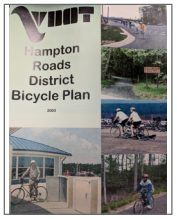
Map 30: Active Transportation Crashes (2012-2016)



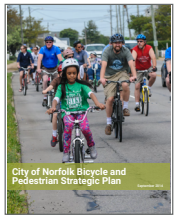
Birthplace of America Trail Study
Managed by HRTPO and adopted on July 20, 2017 by the HRTPO Board.



Surry County's Comprehensive Bicycle and Pedestrian Plan
Produced by VDOT's Hampton Roads District office and adopted in 2016.

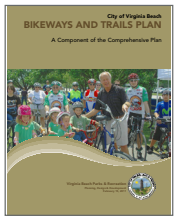


Hampton Roads District Bicycle Plan
Produced by VDOT's Hampton Roads District office in 2003.



Norfolk Strategic Bike and Pedestrian Plan
Adopted in 2015.

Route 5 Capital to Capital Bikeway Feasibility Study
Produced by consultant and prepared for VDOT in 1999.

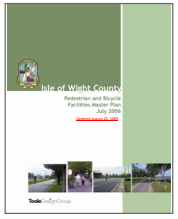


Virginia Beach Bikeways and Trails Plan
Adopted by City Council in 2011.

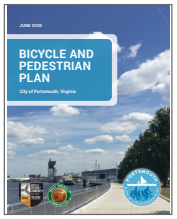
Williamsburg, James City, and York Regional Bicycle Facilities Plan
Developed and adopted in 1993 and updated in 1997.

Suffolk Bicycle and Pedestrian Master Plan
Adopted by City Council in 2017.

Bike Walk Hampton
Adopted by City Council in 2016.



Isle of Wight's Pedestrian and Bicycle Facilities Master Plan
Adopted in 2006 and updated in 2009.



Portsmouth Bicycle and Pedestrian Plan
Anticipated Adoption by City Council in 2021.

Virginia Beach Active Transportation Plan
Anticipated Adoption by City Council in 2021.

Regional Committees

There are also several local and statewide committees devoted to improving active transportation.

Active Transportation Subcommittee (ATS) – In 2017, HRTPO staff formed a subcommittee to provide the HRTPO Transportation Technical Advisory Committee (TTAC) with technical expertise in active transportation planning and policies, assist HRTPO staff in reviewing, scoring, and prioritizing active transportation projects, and oversee the development and implementation of the regional active transportation plan and regional active transportation projects.

VDOT – Hampton Roads District's Pedestrian and Bicycle Advisory Committee (PABAC) – A committee where bicycle activists, active transportation planners and engineers from local governments, state agencies and regional agencies have the opportunity to meet together to discuss policies, standards, projects, and initiatives related to bicycle and pedestrian transportation options.

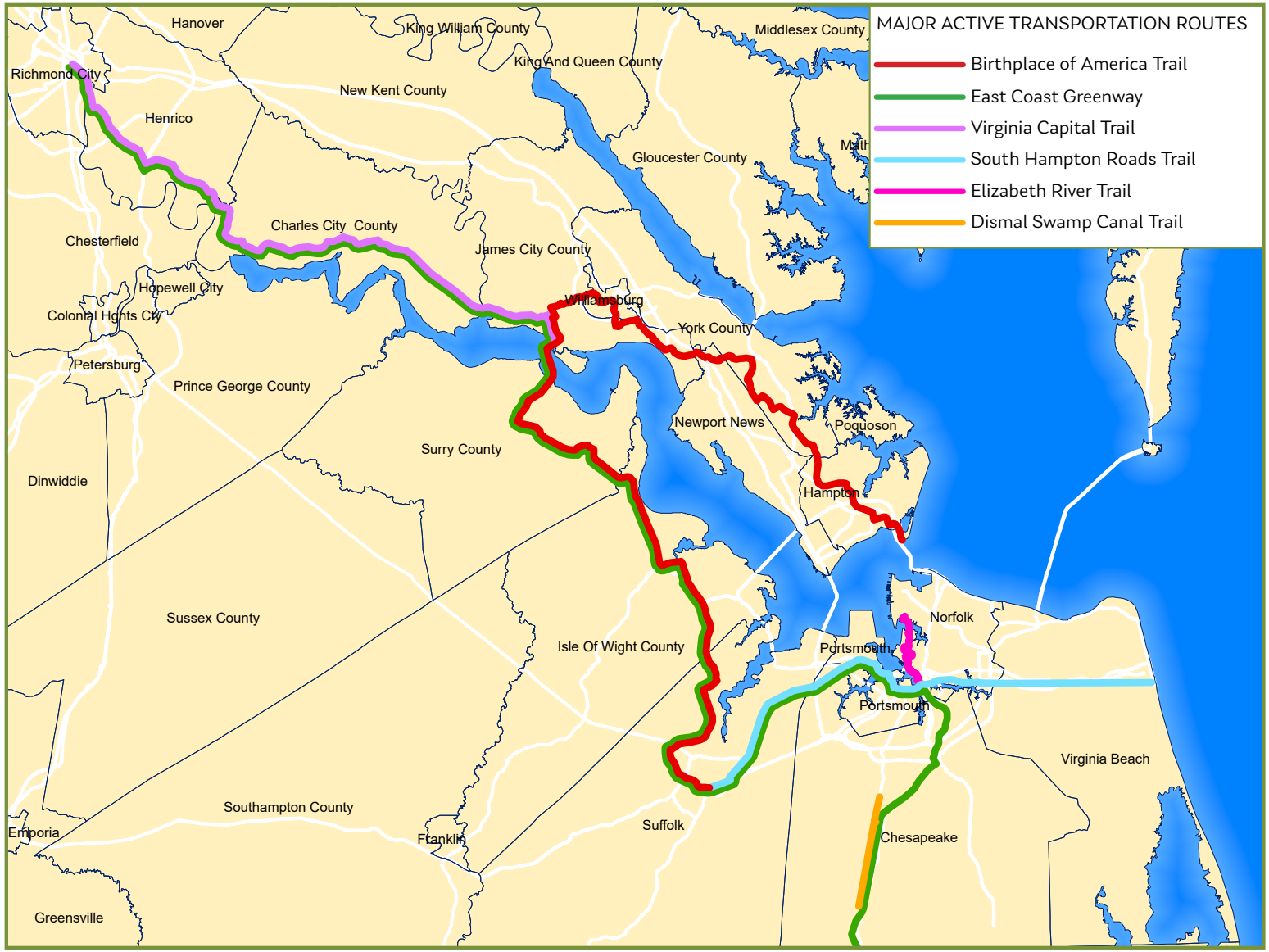
South Hampton Roads Trail Steering Committee – a committee composed of local government officials, HRTPO staff and bicycle activists working together to expand Hampton Roads first cross-region multi-use trail. Continued collaboration has led to multiple sections of the trail being planned, constructed, or completed, as shown in Map 31.

Major Active Transportation Routes

There are multiple regional, state, and national active transportation routes occurring throughout Hampton Roads, including:

- ***East Coast Greenways (ECG)*** - a 3,000-mile biking and walking route linking the major cities on the Atlantic coast. The historic coastal route follows the Virginia Capital Trail (VCT) into James City County and heads south to the northern terminus of the Dismal Swamp Canal Trail, where it leads into North Carolina.
- ***Beaches to Bluegrass Trail*** - a proposed statewide trail intended to connect the Oceanfront and Cumberland Gap.
- ***Virginia Capital Trail*** - a 53-mile shared-use path heading from downtown Richmond to Jamestown following historic Route 5.
- ***Birthplace of America Trail*** - a recommended trail linking the Virginia Capital Trail in Jamestown to Fort Monroe in Hampton and the South Hampton Roads Trail western terminus in Suffolk.
- ***South Hampton Roads Trail*** - a regional trail connecting downtown Suffolk to the Oceanfront in Virginia Beach. Most of the path uses former rail right-of-way. This trail has multiple sections recently built or funded and would connect five of the Southside localities.
- ***Elizabeth River Trail*** - a 10.5-mile-long trail in Norfolk running along the riverfront from Harbor Park Stadium to Terminal Boulevard.
- ***Dismal Swamp Canal Trail*** - a shared-use path in Chesapeake using former Highway 17 right-of-way paralleling the Great Dismal Swamp National Wildlife Refuge and Dismal Swamp Canal. It is also the southern terminus of the East Coast Greenway heading into North Carolina.

Map 31: Active Transportation Trails in Hampton Roads



RAIL TRANSPORTATION

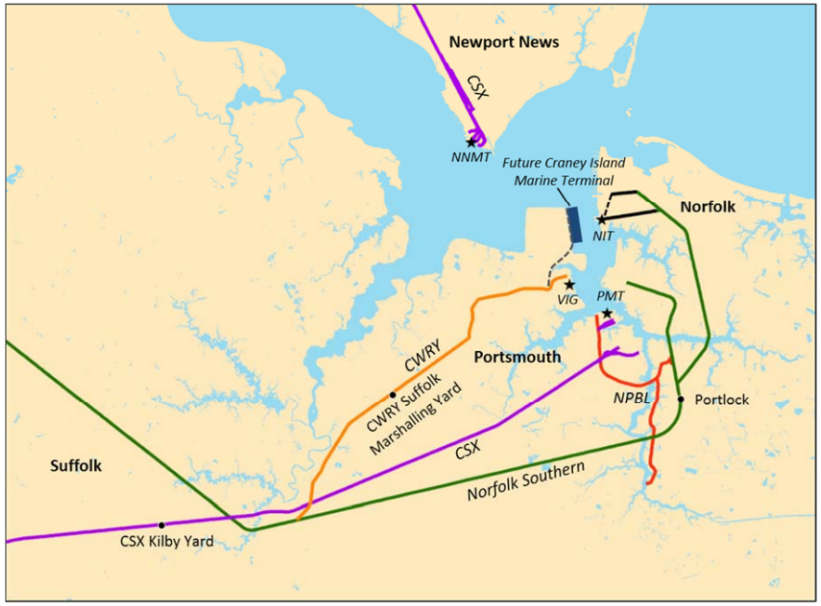
Rail transportation continues to become a more vital component of the Hampton Roads transportation network. Regional passenger rail volumes and options have increased in recent years, as have the number of containers shipped by rail through the Port.

FREIGHT RAIL

General cargo volumes at the Port of Virginia continue to rise. About 35% of all containers handled by the Port of Virginia are transported by rail, which accounted for a total of 552,300 containers shipped by rail in 2018. This is up from 231,100 containers transported by rail as recently as 2009.

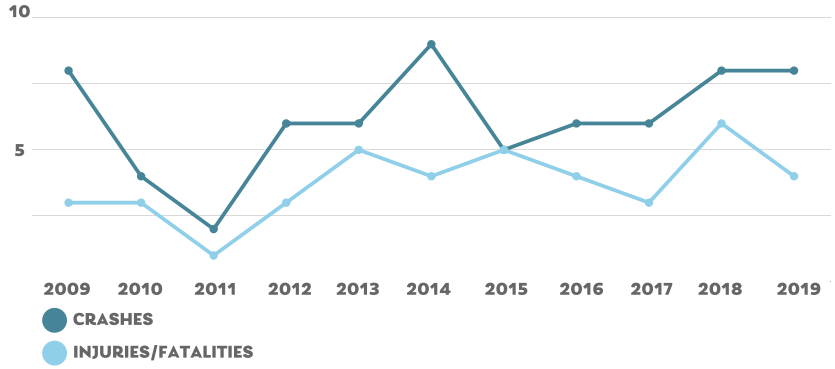
The regional rail system is owned, operated, and maintained by private freight railroad companies. The Hampton Roads network is controlled by two large Class I railroads (CSX and Norfolk Southern) and four smaller, Class III railroads (Commonwealth Railway, Bay Coast Railroad, Chesapeake & Albemarle Railroad, and Norfolk & Portsmouth Belt Line Railroad). Amtrak operates on the CSX line on the Peninsula and on a Norfolk Southern line on the Southside. Most of the regional rail system is single-tracked, which contributes to conflicts and bottlenecks not only between freight trains but also between freight and passenger trains.

With the increasing number of freight (and passenger) trains crossing the region each day, safety and congestion at highway-rail crossings are a concern. There are 406 highway-rail crossings in Hampton Roads, of which 73% are at-grade. Most of these at-grade crossings are in rural portions of the region, although there are many in fast growing areas such as Chesapeake, James City County, and Suffolk.



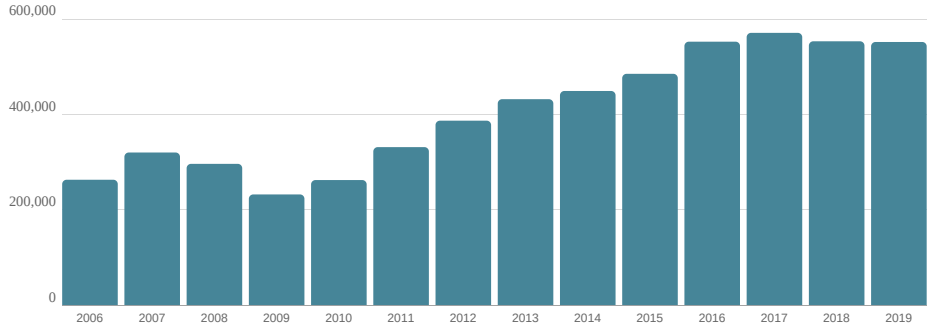
Map 32: Rail Lines in Hampton Roads

Figure 21: Number of Crashes and Injuries/Fatalities at Highway-Rail Crossings in Hampton Roads



Data Souce: Federal Railroad Administration

Figure 22: Rail Containers Handled by the Port of Virginia



Data Souce: Virginia Port Authority

In 2018 there were 8 crashes between trains and vehicles at highway-rail crossings in Hampton Roads, resulting in 5 injuries and 1 fatality. Looking over the last decade, there were 60 crashes with 31 injuries and 6 fatalities. This is a much lower number of crashes than the previous decade (1999-2008), when there were 107 crashes with 29 injuries and 3 fatalities.

FREIGHT RAIL STRATEGIES

Several physical and operational improvements have recently been completed that improved freight rail transportation to and from Hampton Roads and its ports:

Heartland Corridor – Norfolk Southern and several states partnered on a project to raise the vertical clearances of tunnels to allow for the use of trains with double-stacked containers between the Port of Virginia and the Midwest. The project reduces the distance that double stack trains travel between Hampton Roads and Chicago by 250 miles. The Heartland Corridor project was completed in September 2010.

National Gateway – Like the Heartland Corridor project, CSX is in the process of improving rail connections between Mid-Atlantic ports and the Midwest. The project – which is funded by CSX, the federal government, and various states – will remove vertical obstructions (including a number of bridges and tunnels) to permit trains with double-stacked containers. The first phase of the National Gateway project was completed in September 2013.

Commonwealth Railway Relocation – The Commonwealth Railway is a short line railroad that connects the Virginia International Gateway marine terminal in Portsmouth (and future Craney Island terminal) with CSX and Norfolk Southern lines in Suffolk. A section of the line in Portsmouth and the Western Branch section of Chesapeake was relocated to the median of I-664 and the Western Freeway. This relocation of 4.5 miles of track removed 14 at-grade crossings, which helped improve congestion, travel time reliability, and safety in these communities. The first relocated rail line was opened in 2010, and a parallel line was completed in 2011.

Hampton Boulevard Railroad Overpass – The railroad overpass crossing Hampton Boulevard into Norfolk International Terminals (NIT) was completed in 2015. The project greatly reduces conflicts between trains entering and exiting NIT and Hampton Boulevard traffic.

There have also been several smaller rail infrastructure projects completed in recent years by both the private and public sector, such as signal and crossing upgrades.

In order to assist with future planning for freight rail improvements, the General Assembly initiated the development of a Master Rail Plan for The Port of Virginia. The objective of this Master Rail Plan is to improve the competitive position of the Port through improved rail service to Port of Virginia facilities. The Master Rail Plan identifies impacts, constraints, recommendations and other considerations regarding increased rail traffic on a terminal by terminal basis.

Four recommendations were included in the Master Rail Plan. These recommendations are:

- State planning and investment in rail infrastructure serving the Port should maximize utilization of existing rail and rail-related infrastructure among all parties.
- Develop policies and/or programs to support local infrastructure planning and investment where rail activity occurs.

Where opportunities to foster Port-served private industrial activities are present, maximize the value of

- Port assets by improving coordination of on- and off-terminal development.
- The Plan identifies off-terminal impacts and constraints as intermodal rail traffic increases at the marine terminals. The following efforts will support near-term competitive improvements or community relief for intermodal rail activities, provided that the host railroad accepts the improvements and any associated conditions, and that planned terminal expansions occur as planned.

Norfolk International Terminal (NIT)

- Double-tracking the rail line between Portlock and NIT would lower operational costs for Norfolk Southern (NS), Norfolk and Portsmouth Belt Line Railroad (NPBL), and other railroads that all use the line.
- A direct connection between Lambert's Point line used by NPBL and the rail line to NIT once existed; reconstructing it would improve access for NPBL to serve its customers on the Sewell's Point line.
- Establish storage for a complete unit train (i.e. no breaking) on NPBL system in order to more efficiently stage longer trains.

Virginia International Gateway (VIG)

- Commonwealth Railway (CWRY) corridor should be double-tracked along its full length to support increased rail traffic at VIG.
- CWRY's Suffolk Marshalling Yard should have two additional tracks constructed (already partially funded by an REF grant).
- The interchange between CWRY and the Class I railroads in Suffolk should be evaluated for improvements.
- Related community impacts resulting from increased rail traffic should be identified and mitigated through the program described in Recommendation 2.

Portsmouth Marine Terminal (PMT)

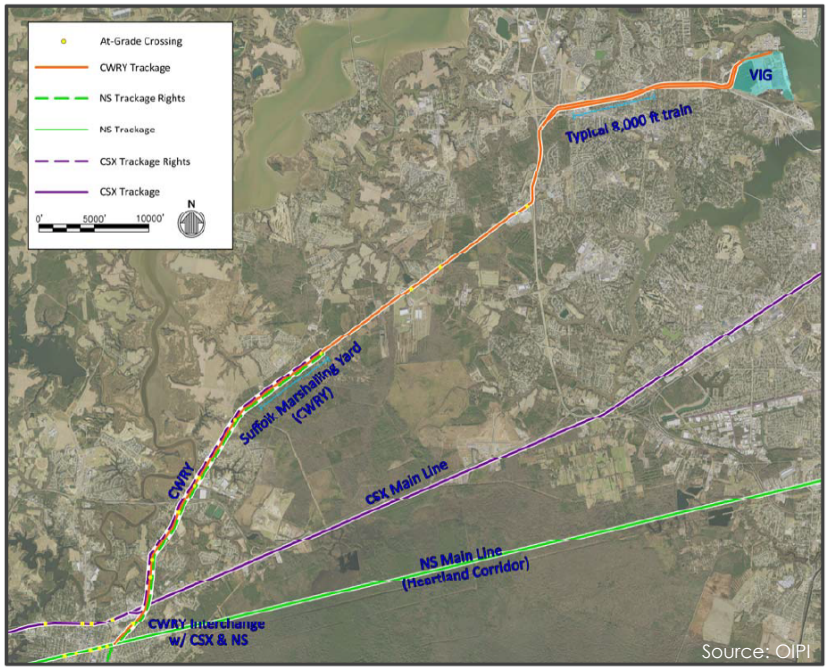
- If competitive rail operations are established at PMT, improvements to circumvent the physical constraints of the Pinner's Point interchange could mitigate some potential rail conflicts. This would likely require off-terminal property to construct.
- There are likely on-terminal solutions to mitigate rail conflicts on the east lead, once Midtown Tunnel construction is complete, but those will depend on any on-terminal activities or users.

Newport News Marine Terminal (NNMT)

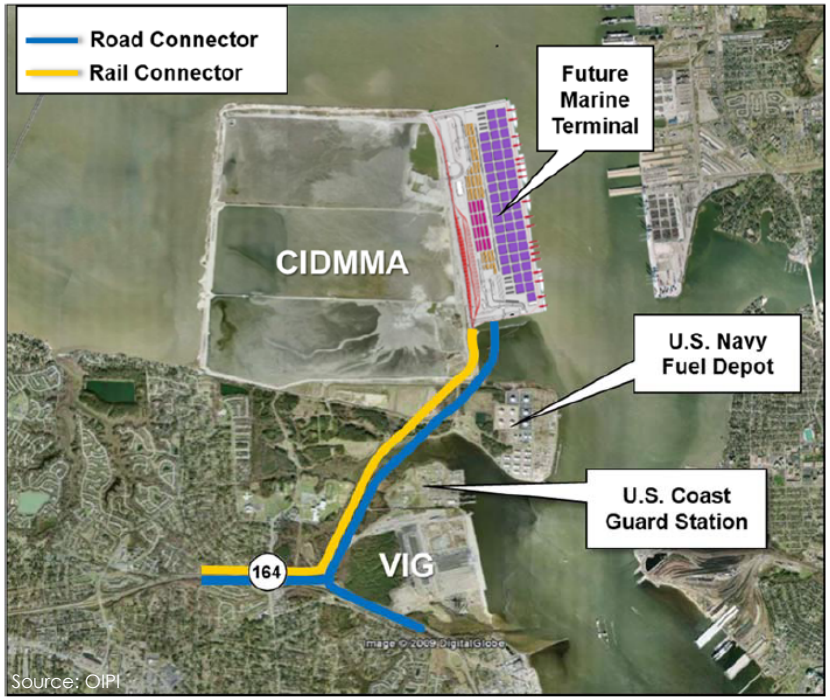
- Engagement with CSX to address vertical clearance restrictions on the Peninsula Subdivision that currently limit the height of rail cars (in particular, multi-level automobile carriers) would allow the Port to more effectively compete for automobile cargo and other breakbulk cargo through NNMT.

Future Craney Island Marine Terminal (CIMT)

- Property for the rail corridor needs to be acquired.
- A significantly larger CWRY marshalling yard will be necessary to support CIMT at full build out. A process to identify potential sites for this yard should be initiated.
- Improvements will be needed near VIG to allow CIMT traffic to pass while trains arrive at or depart from VIG.
- Related community impacts must be identified and resolved.



Map 33: VIG Overall Rail System



Map 34: Craney Island Road and Rail Connector Concept

PASSENGER RAIL STRATEGIES

In December 2012, Amtrak began operating intercity passenger rail service to the Southside of Hampton Roads, complementing the existing service on the Peninsula. Trains serve a new multi-modal station at Harbor Park in Norfolk and provide direct service to cities in the Northeast Corridor. The Norfolk station is currently served by two trains daily, and plans include adding an additional train each day.

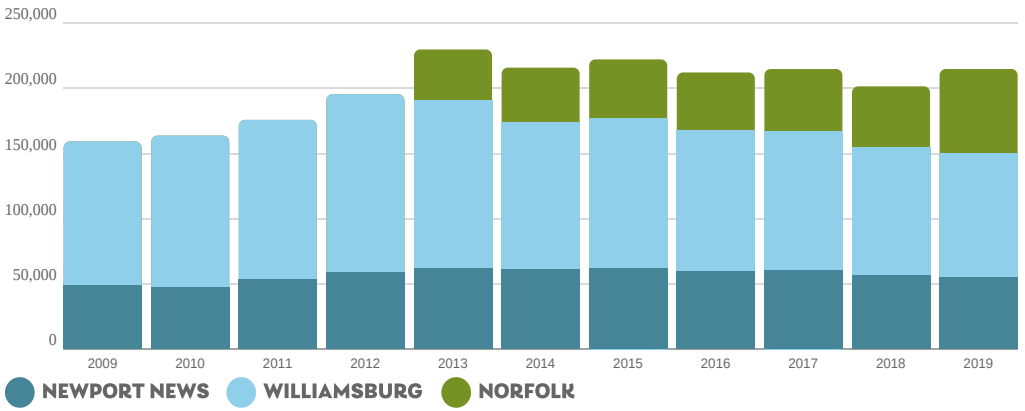
The new Amtrak service to the Southside contributed to a continued increase in regional passenger levels. There was a total of 214,600 passengers who boarded or departed Amtrak trains in Hampton Roads in Federal Fiscal Year (FFY) 2019. The number of passengers boarding or departing Amtrak trains in Hampton Roads decreased slightly from FFY 2017 to FFY 2018 but increased 31% over the last decade.

There are several major plans to further improve intercity passenger rail transportation to and from Hampton Roads, as detailed below:

Virginia State Rail Plan – The Federal Railroad Administration (FRA) requires that states update their rail plans at least every five years to be eligible for federal rail funding. The 2017 Virginia State Rail Plan is the latest plan and is available on the Virginia Department of Rail and Public Transportation website.

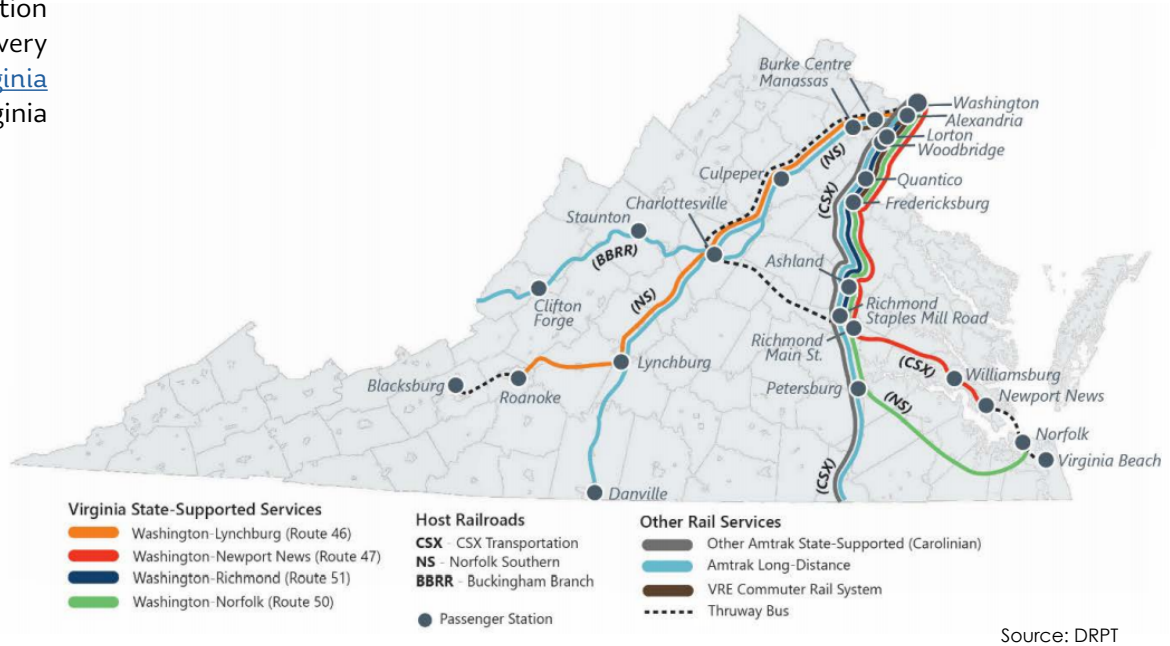
Figure 23: Amtrak Ridership in Hampton Roads

Includes Boardings and Alightings

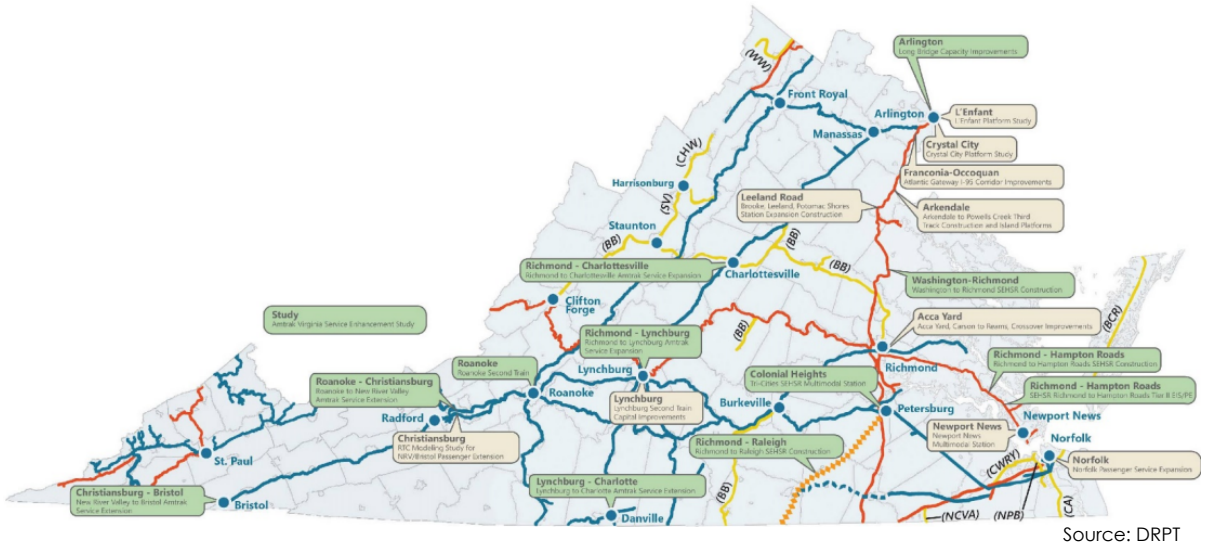


Data Source: Amtrak. Federal Fiscal Years run from October to September

Map 35: Existing Passenger Routes in Virginia



Source: DRPT



Source: DRPT

Map 36: Proposed Passenger Rail Projects in Virginia

Within Virginia, a list of priority improvement and investment projects were included in the Virginia State Rail Plan. These projects outline some of the major initiatives that are on-going and expected for the future in the corridor:

Washington to North Carolina Corridor:

- Priority projects include adding capacity to the Long Bridge, a major chokepoint affecting CSX, Amtrak, and VRE service, and implementing additional capacity improvements to the corridor in Northern Virginia via the Atlantic Gateway improvement program.
- Longer term, additional improvements will be necessary to support improved passenger service. These improvements are outlined in the R2R study, and in the DC2RVA Tier 2 EIS that is currently underway. The long-term phasing and timing of these improvements will be based on funding availability, congestion levels, and passenger service benefits.

Crescent Corridor:

- Priority projects include expanded passenger service to Lynchburg and Roanoke, and improving capacity and connectivity with shortline railroads and the Virginia Inland Port. Longer term considerations for this corridor include adding passenger service to southwest Virginia.

East-West Corridor:

- Priority projects include maintaining a state of good repair, particularly on the Buckingham Branch railroad, and supporting existing passenger services. This includes investments to add a new maintenance facility and improvements to reduce conflicts between passenger trains and freight trains on the corridor between Richmond and Newport News. Longer term considerations include expansion of east-west passenger connections.

Heartland Corridor:

- Priority improvements include adding two additional round-trip passenger trains to Norfolk by extending two existing trains from Richmond. Longer term initiatives include the study of additional and/or higher speed passenger services to Hampton Roads and making critical east-west multimodal connections.

Southeast High-Speed Rail – The Southeast High-Speed Rail Corridor (SEHSR) is one of eleven proposed high-speed passenger rail corridors designated by the U.S. Department of Transportation. It is part of an overall plan to extend service with maximum speeds of 110 mph from the existing high-speed rail on the Northeast Corridor to points in the Southeast.

The corridor was originally designated as running from Washington, D.C. to Charlotte through Richmond and Raleigh, with a spur between Richmond and Hampton Roads (which is addressed further under the Richmond to Hampton Roads Rail Project). Extensions to the corridor have been added to South Carolina, Georgia, and Northern Florida.

The Washington DC to Richmond Tier II Environmental Impact Statement (EIS), covering the 123-mile section between the two cities, was completed in 2019. This report compliments the Richmond to Raleigh Tier II EIS.

In addition, the North Carolina-Virginia Interstate High-Speed Rail Compact Commission, which includes five General Assembly members from each state, meets on a regular basis to focus on coordinating the development of the SEHSR corridor in the two states.

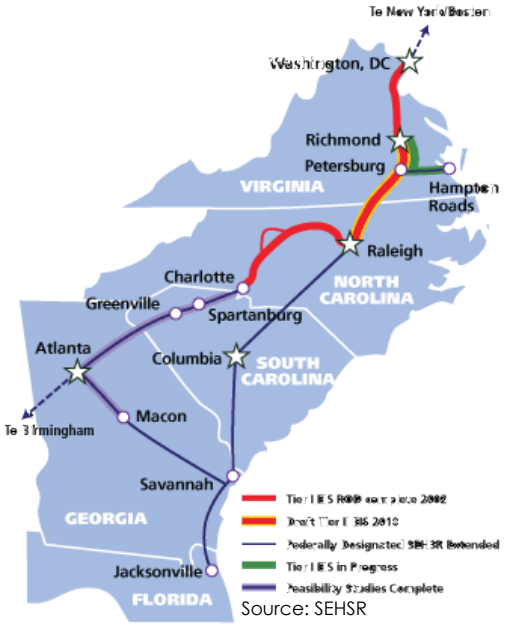
Richmond to Hampton Roads Rail Project – Beginning in 2009, the Virginia Department of Rail and Public Transportation (DRPT) began investigating improved passenger rail service between Richmond and Hampton Roads as an extension of the Southeast High-Speed Rail Corridor. The resulting Richmond/Hampton Roads Tier I Final Environmental Impact Statement was approved by the Federal Railroad Administration (FRA) in August 2012 and the Record of Decision for the Tier I EIS was approved by FRA in December 2012.

The Tier I Final EIS recommends increased frequency and higher speed passenger rail service between Richmond and Hampton Roads. The preferred alternative provides for three daily round-trip trains operating at a maximum speed of 79 mph on the current Peninsula route, and six daily round-trip trains in a new higher speed passenger rail service between Richmond and Norfolk through Petersburg and Bowers Hill. This higher speed passenger rail service would have a maximum speed of 90 mph.

Hampton Roads Passenger Rail Vision Plan – To complement DRPT's work in the Richmond to Hampton Roads passenger rail corridor, the HRTPO Board approved a resolution to support High-Speed and Intercity Passenger Rail in 2009. The resolution supported the designation of a high-speed rail corridor along the Norfolk Southern/Route 460 rail corridor from Norfolk to Richmond and endorsed enhanced intercity passenger rail service along the CSX/I-64 rail corridor from Newport News to Richmond.

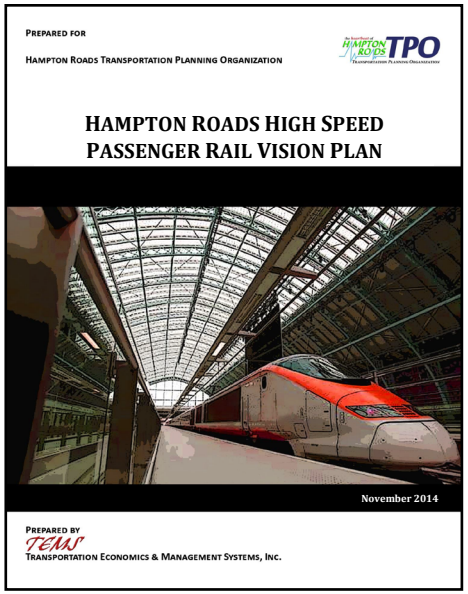
The resolution also identified the need to procure consultant services to advise the HRTPO on necessary steps to position Hampton Roads to be competitive for future rounds of federal passenger rail funding, and to develop a regional high-speed and intercity passenger rail vision plan.

Based on the HRTPO board's resolution, a consultant team specializing in passenger rail planning was secured for the HRTPO, in coordination with DRPT and VDOT, to evaluate the potential of high speed and enhanced passenger rail service alternatives in the designated corridors. Additionally, a Passenger Rail Task Force was created to provide input and direction to the consultant team at key decision-making points throughout the planning process.



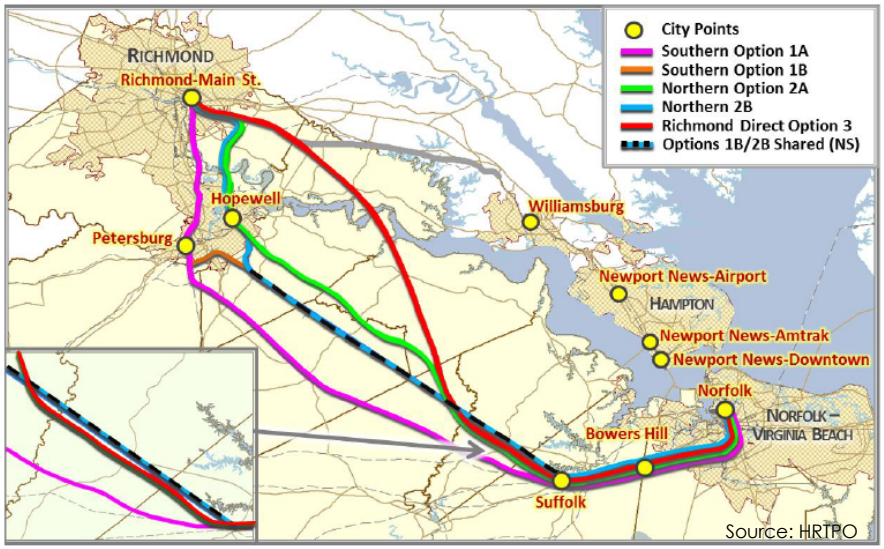
Source: SEHSR

Map 37: Southeast High Speed Rail



Four technical reports have been produced by the consultant and approved by the HRTPO Board:

- Phase 1A – Preliminary Vision Plan - In the Phase 1A document, the consultant evaluated the concept and established the case for high speed rail in Hampton Roads. The preliminary assessment indicated that both the Peninsula CSX and Southside Norfolk Southern corridors are economically and financially feasible for providing high speed rail service between Hampton Roads, Richmond, and Washington D.C., as they meet the thresholds established by the Federal Railroad Administration for a public/private partnership.
- Phase 1B – Blueprint Study - In Phase 1B, the consultant developed a "blueprint" for the implementation of the project and its funding. The Blueprint Study sets out a 15-20 year program to bring high speed rail to the Hampton Roads-Richmond-Washington D.C. corridor. It provides the steps that are required to implement the program, the short and long term timing of steps, key milestones, critical actions and funding requirements. The Blueprint Study also identifies several issues that will need to be addressed.



Map 38: Hampton Roads Vision Plan Alternatives

- Phase 2A – Data Collection - The Phase 2A effort established and assembled the needed databases for developing the Service Development Plan application for the Norfolk-Richmond passenger rail corridor, and the analysis of the market, routes, technology, and environmental conditions needed to apply for Federal Railroad Administration passenger rail project funding.
- Phase 2B – Alternatives Analysis - This report focuses on the various alternatives from the vision plan and evaluates the financial and business impacts of each alternative. The Phase 2B study determined that Option 4 was the best of the alternatives examined, which combines the Richmond Direct Option 3 with increased service on the Peninsula.

A final report, titled the Hampton Roads High Speed Passenger Rail Vision Plan, was also produced by the consultant in 2014, which tied together the information included in the four technical reports.

The Hampton Roads Regional Transit Vision Plan also includes plans for commuter rail and high/higher speed rail in the region. The Transit Vision Plan is described in detail in the Public Transportation section of this report.

More information on the Hampton Roads Passenger Rail Vision Plan is included at http://hrtpo.org/page/high-speed-passenger-rail.

TECHNOLOGY AND THE FUTURE

What will transportation look like in the future? This is a commonly asked question that has been inquired frequently over the decades. Its significance could not be greater considering how drastically transportation could change with the development of connected and autonomous vehicles.

Connected Vehicles

Through Connected Vehicle technology, a vehicle can communicate with other vehicles, with infrastructure, and with personal devices. How is this technology different than what is currently available in vehicles today? Vehicles that are equipped with advanced crash avoidance technologies may have on-board sensors, cameras, and radar detection that warn drivers of impending danger. As a result, drivers can take corrective action behind the wheel. Connected Vehicle technology is also intended to warn drivers of impeding danger but with more refined and technologically advanced information. Under Vehicle to Vehicle (V2V) communications, connected vehicles would use short-range radio signals or 5G (or similar future technologies) to send and receive messages regarding a vehicle's information such as speed, direction, and brake status. With more robust detection capabilities available in Connected Vehicle technology, drivers can receive even earlier advanced warnings, providing drivers more time to react and avoid impending danger.

Source: USDOT

Autonomous Vehicles

Autonomous Vehicles (AVs), also known as driverless or self-driving vehicles, use sensors and software to operate vehicles with little to no human driver interaction. Current research and development in AVs have categorized autonomy into six levels.

Figure 24: Society of Automotive Engineers (SAE) Levels of Autonomy

0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

CHALLENGES OF AUTOMOBILE TECHNOLOGY

AVs could produce major societal impacts. According to a 2015 National Highway Traffic Safety Administration (NHTSA) crash report, 94% of serious crashes are due to human error. AVs could potentially remove human error in operating a vehicle, thereby saving lives, and reducing injuries.

AVs may also provide benefits from an economic standpoint. According to the NHTSA study, the economic cost of vehicle crashes in 2010 totaled $242 billion. This total includes the cost of lost productivity, medical costs, legal and court fees, emergency service costs, insurance administration costs, property damage, and workplace losses. Major cost savings could result from a reduction in vehicle crashes due to automation.

Depending on the usage and level of automation achieved for AVs, this technology has the significant potential to improve traffic flow and reduce congestion. According to the NHTSA, Americans spent nearly 7 billion hours in traffic delays in 2014. This unproductive time stuck in traffic increases fuel costs and vehicle emissions, ultimately impacting quality of life.

AVs may also increase mobility opportunities for parts of the population that currently experience barriers to mobility, such as the elderly, disabled populations, even the youth. Since AVs are driverless/self-driving, these populations who cannot currently drive themselves will have access to technology that will drive for them. A result of this phenomenon will likely be more trips and thus, more congestion on the transportation network. However, with the autonomy of these vehicles, passengers can use this time to do other things (e.g. work, sleep, play games) and may not mind the additional travel time.

Another anticipated impact of AVs is that users may be willing to travel further distances between home and work since they can occupy their time during the trip with non-driving tasks. This could result in land use impacts such as sprawl, with people more willing to live in fringe suburban or rural areas. There may also be a reduction in parking areas as AVs could be sent back to the house or even be put to work picking up other passengers (e.g. driverless Uber, Lyft, etc.).

STRATEGIES TO ADDRESS THE UNCERTAINTY

There is still a lot of uncertainty regarding the true impacts of Connected and Autonomous Vehicles (CAVs) since they are still under research and development and data is scarce. Predictions on usage and impacts are being made now, but there are many questions over how well and how fast CAVs will be accepted by society 20 to 30 years from now. CariD, a car parts manufacturer, conducted a survey to gauge people's opinions on autonomous vehicles. From this survey of 1,034 participants, about 60% of participants indicated that they would feel somewhat unsafe or very unsafe riding in an autonomous vehicle (40% indicated feeling somewhat safe or very safe). Additionally, 71% of participants indicated that they would miss driving in a fully autonomous world. However, these opinions could certainly change given more time and data on the technology.

As part of an update to the Hampton Roads Travel Demand Model (a planning tool used to forecast traffic and transportation impacts), a CAV framework was included to explore potential impacts of these technologies. With this new CAV framework, staff can apply exploratory scenario planning to investigate potential impacts to the transportation system. This can be done by adjusting assumptions for market penetration, level of carsharing and ridesharing as a substitute for private vehicle use, zero occupant vehicle trips, parking location and behavior changes, decreases in disutility of travel time (the perceived burden of travel time), and induced trip making (new trips being made due to the implementation of this technology). Assumptions can also be made for CAV impacts to capacity and speed on regional roadways. As CAV data becomes more available, the forecasting ability of the Travel Demand Model will improve.

3

CHAPTER 3: CORNERSTONES OF THE REGIONAL ECONOMY

The Hampton Roads economic base has grown around three primary industries that help support the regional economy. The Department of Defense is heavily invested in Hampton Roads due in large part to the region's harbor and its strategic position on the east coast. The region's deep harbors also support an extensive port industry that moves cargo throughout the region and attracts many logistics-related industries. Extensive beaches and waterways coupled with numerous historic sites bring millions of tourists annually to Hampton Roads. These three basic-sector industries support much of the region's economy by bringing outside income and investments into Hampton Roads; however, they also create a number of transportation challenges unique to the region.

MILITARY ISSUES

MILITARY CHALLENGES

Hampton Roads contains one of the largest natural ice-free harbors in the world, making the region an attractive location for U.S. Department of Defense (DoD) facilities. The region's military presence is comprised of nine major military installations, including three joint-base complexes that span multiple locations. Hampton Roads is home to Naval Station Norfolk, the largest naval base in the world, as well as dozens of other sites with representation from five of the six branches of the military—Navy, Army, Air Force, Coast Guard, and Marine Corps.

Total military population in Hampton Roads is estimated to be between 120,000 – 150,000, including active-duty, civilian, and contracted personnel. The Bureau of Economic Analysis (BEA) estimates 82,000 active-duty and reserve personnel while the HRPDC estimates roughly 40,000 civilians employed by the DoD. Military population estimates are historically difficult to pinpoint with extreme accuracy due to security issues, which often leads to inconsistency in reported figures from regional organizations. This should not diminish the importance of military presence on the local economy, as the DoD spends over $8 billion per year in our region through contracts. Efficient military operations require a transportation network that moves cargo and personnel quickly and safely. Not only does the heavy presence of the military highlight the importance of the condition of the region's transportation network on the future viability of the region as a military hub, but it impacts national security as well.

Military Transportation Concerns

Given the strong military presence in the Hampton Roads region, the HRTPO has engaged various stakeholders to determine military concerns related to transportation. During HRTPO Board meetings in 2009 and 2010, several local military representatives (active and retired) provided statements expressing concerns regarding transportation in Hampton Roads. Some representatives requested that the HRTPO Board consider their ability to respond quickly to military crisis and evacuation in times of national defense emergencies or natural disaster. They stated that traffic congestion affects commuting for their military personnel as well as travel times between installations.

Military leaders also expressed concern about traffic congestion's impact on overall quality of life for service members and their dependents. According to these military representatives, mobility is impeded by insufficient local transportation infrastructure. They mentioned several proposed projects as being important to the military, including a light rail extension to Naval Station Norfolk and high-speed and intercity passenger rail service connecting Hampton Roads to Richmond, Washington, DC and beyond. A high-speed rail connection would allow military servicemen and officials to conduct a full day's business in Washington, D.C. without remaining overnight.

These military representatives expressed concern regarding traffic safety and congestion and suggested some potential consequences for the Hampton Roads region. They stated that local service members and their families who are routinely impacted by traffic challenges are therefore less likely to spend additional tours of duty in this location or consider this area for retirement. Furthermore, they suggested that transportation congestion may hinder the ability to maintain or bring additional military personnel to our region. For these reasons, it is important for the HRTPO to plan and implement transportation improvement projects that provide a safe and efficient transportation network for the military.

STRATEGIES TO ADDRESS MILITARY CONCERNS

Late in 2009, several local military representatives told the HRTPO Board that congestion and delays at bridges and tunnels hurt mission performance effectiveness and efficiency. Rear Admiral Byron E. Tobin (Retired US Navy) addressed the HRTPO Board in February 2010 stating:

> "...we are dependent, in large measure, upon the resources and support of this region for the efficient and successful conduct of our mission. One of the key components of that success is mobility, [which is currently impeded] because our transportation infrastructure is in decline and struggling to meet our needs."

In response, the HRTPO Board placed greater emphasis on military transportation planning in the region and endorsed annual military briefings by military representatives to the HRTPO Board and to the Commonwealth Transportation Board, and included a new Hampton Roads Military Transportation Needs Study in its work program (FY 2011 Unified Planning Work Program) to identify and address the transportation needs of the military in Hampton Roads. The overall purpose of this planning effort is to determine military transportation needs and to provide an efficient and safe transportation network for the military in Hampton Roads.

The original *Hampton Roads Military Transportation Needs Study* is comprised of three phases:

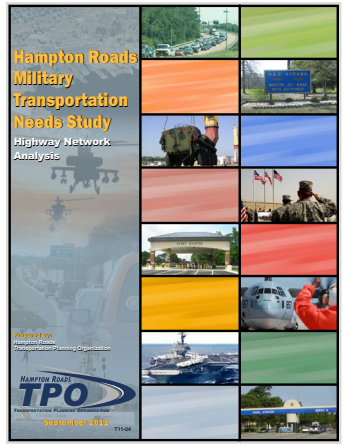
1. Highway Network Analysis (September 2011)
2. Military Commuter Survey (September 2012)
3. Roadways Serving the Military and Sea Level Rise/Storm Surge (July 2013)

In July 2018, HRTPO completed a *Hampton Roads Military Transportation Needs Study: 2018 Update*. This report updated the data and analysis contained in Phase I (Highway Network Analysis) and Phase III (Roadways Serving the Military and Sea Level Rise/Storm Surge) with the most recent data available.

The following pages contain a summary of prior phases.

Phase I: Highway Network Analysis

Phase I of the *Hampton Roads Military Transportation Needs Study* was completed and approved by the HRTPO Board in September 2011. In this first phase, HRTPO staff worked with various stakeholders – local military representatives, state and federal agencies, port officials and local jurisdictions – to determine transportation concerns and needs of the local military. The HRTPO staff identified a roadway network that includes both the Strategic Highway Network (STRAHNET) and additional roadways that serve the military sites and intermodal facilities not included in the STRAHNET (see Map 39). STRAHNET (developed by the U.S. Department of Defense) serves as the minimum national defense public highway network needed to support a defense emergency and are used for day-to-day military cargo movement. Staff analyzed this "Roadways Serving the Military"



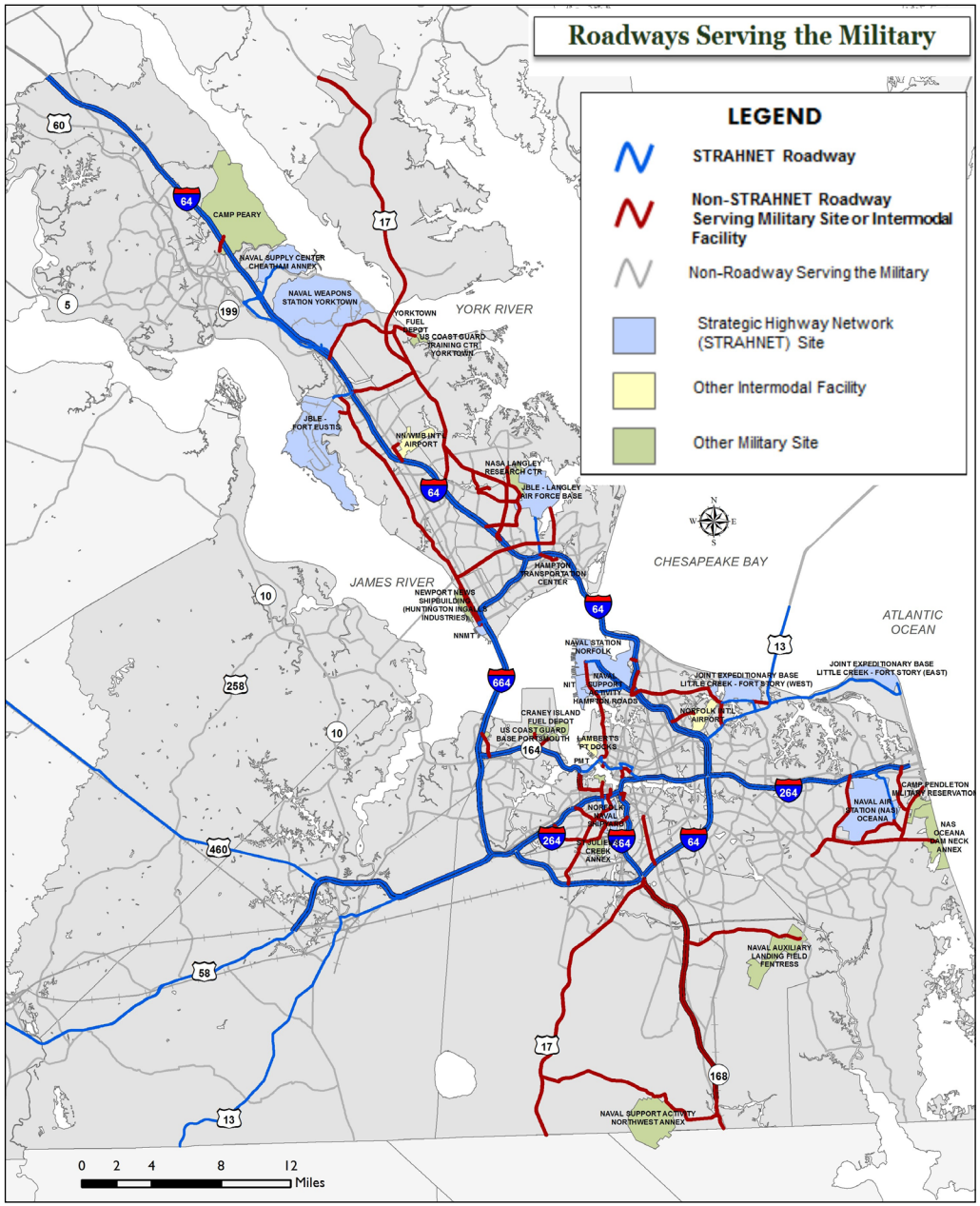
network to determine deficient locations, such as congested segments, deficient bridges, and inadequate geometrics. The study made numerous recommendations to address existing deficiencies and to accommodate future military travel needs, including revisions to current STRAHNET designations, increasing vertical clearance of tunnels, expanding the width of highway lanes to accommodate military vehicles, rehabilitating or replacing structurally deficient bridges, extending light rail transit to Naval Station Norfolk and high-speed passenger rail service to Washington, D.C.

Phase II: Military Commuter Survey

The HRTPO staff continued this study with the creation of the first region-wide *Military Commuter Survey*, which was conducted from November 8, 2011 to February 24, 2012. Via the survey, the HRTPO collected information about the commuting experience of military personnel (active-duty, civilians, contractors, reservists and others) traveling to/from the region's military bases, receiving a total of 10,994 survey responses. The survey was developed by HRTPO staff in concert with the commands of the region's military installations and various other transportation stakeholders. The purpose of the survey was to determine the transportation challenges facing local military personnel during their daily commutes in Hampton Roads.

The survey was developed using Google documents and hosted on the HRTPO website. Even though survey responses were

Map 39: Roadways Serving the Military - Hampton Roads



Prepared by: HRTPO Staff, 2018

sought from all military commuters in the region, military commuters were specifically targeted who travel to/from 29 of the 38 military and supporting sites identified in Phase I of the study. These 29 military sites are the primary locations for military-related employment. The remaining 9 locations are supporting sites, such as port terminals and airports, which move military personnel and goods in the event of a national or local emergency. One benefit of hosting the survey on the HRTPO website was that thousands of military personnel who reside within Hampton Roads were introduced to the HRTPO, some learning about its metropolitan planning process and activities for the first time.

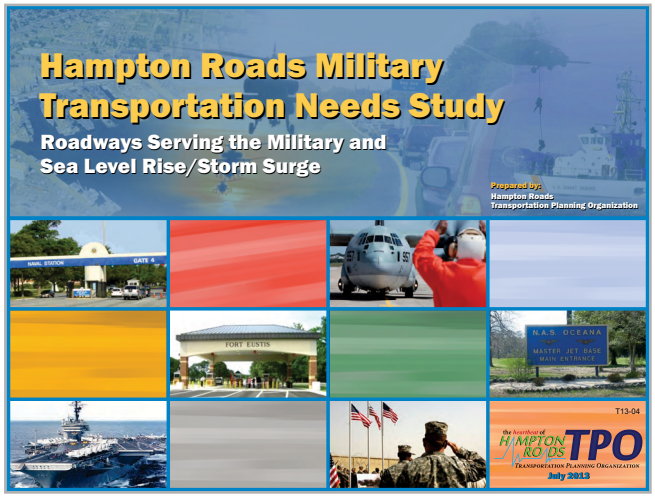
Respondents were asked to identify items such as length of morning and afternoon commutes, mode of transportation, transportation problems, and any locations of recurring trouble along their commute. The top reported transportation problems by military commuters were traffic congestion (79%), traffic backups at military gates (67%), and poor roadway maintenance (42%). At the end of the survey, respondents were asked to submit any suggestions they had regarding transportation in the region. Not only was excellent feedback provided, but many expressed thanks for having the opportunity to communicate their transportation challenges.

Phase III: Roadways Serving the Military and Sea Level Rise/Storm Surge

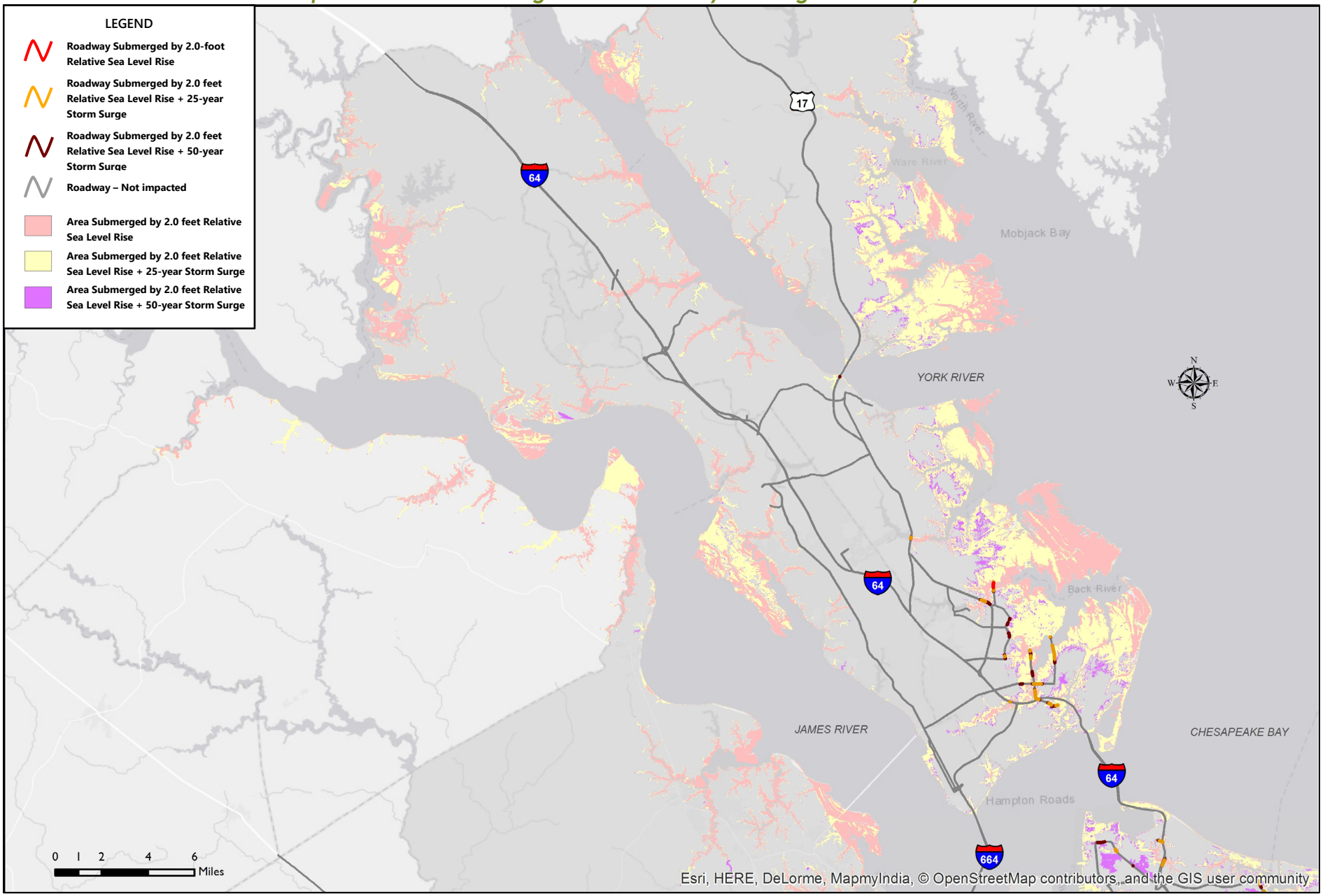
The impacts of relative sea level rise and storm surge have been recognized along the southeast coast for many years, particularly for low-lying communities such as Hampton Roads, Virginia. National, state, regional, and local organizations have participated (or are currently participating) in initiatives that address this pressing issue in order to raise awareness and develop potential solutions. This study (Phase III) builds on previous studies and related work to estimate the relative sea level rise and potential storm surge threats to the "Roadways Serving the Military" network established in phase one of the *Hampton Roads Military Transportation Needs Study*. This third phase of the study continues the work in phase one by determining flooding-based deficient locations along the roadway network. It expands upon the work and methodologies developed by the Hampton Roads Planning District Commission (HRPDC) and the Virginia Institute of Marine Science (VIMS) by identifying military roadway segments vulnerable to submergence. Additionally, submergence of other local roadways that provide access to and from the "Roadways Serving the Military", which may be vulnerable to flooding have been identified.

Given the uncertainty in how much relative sea level rise will occur and how fast it will accelerate, current research suggests that 1.5 feet of rise could occur in Hampton Roads sometime between 2032 and 2065. With the forecast year of the next *HRTPO Long-Range Transportation Plan* being 2040, a 1.5-foot relative sea level rise scenario was used in this analysis. Based on past storm events, a 3-foot storm surge is a reasonable level to expect for moderate future storms. For example, the surge at Sewells Point during Hurricane Irene (2011) was measured at 4.2 feet, while the surge from Hurricane Isabel (2003) at the same location was measured at 4.4 feet. The combination of 1.5 feet of relative sea level rise and 3 feet of storm surge would result in a total relative water rise of 4.5 feet.

Phase III used elevation data from the HRPDC in conjunction with Geographic Information System (GIS) software to identify potential flooding for "Roadways Serving the Military", specific segments that would be submerged by 4.5 feet of relative water rise (1.5' relative sea level rise plus 3' storm surge). Maps of these locations are provided on the following pages (Maps 40 and 41). The results show that the "Roadways Serving the Military" in the Cities of Chesapeake, Hampton, Norfolk, Portsmouth, and Virginia Beach are vulnerable to potential future relative water rise. Phase III was completed and approved by the HRTPO Board in July 2013.



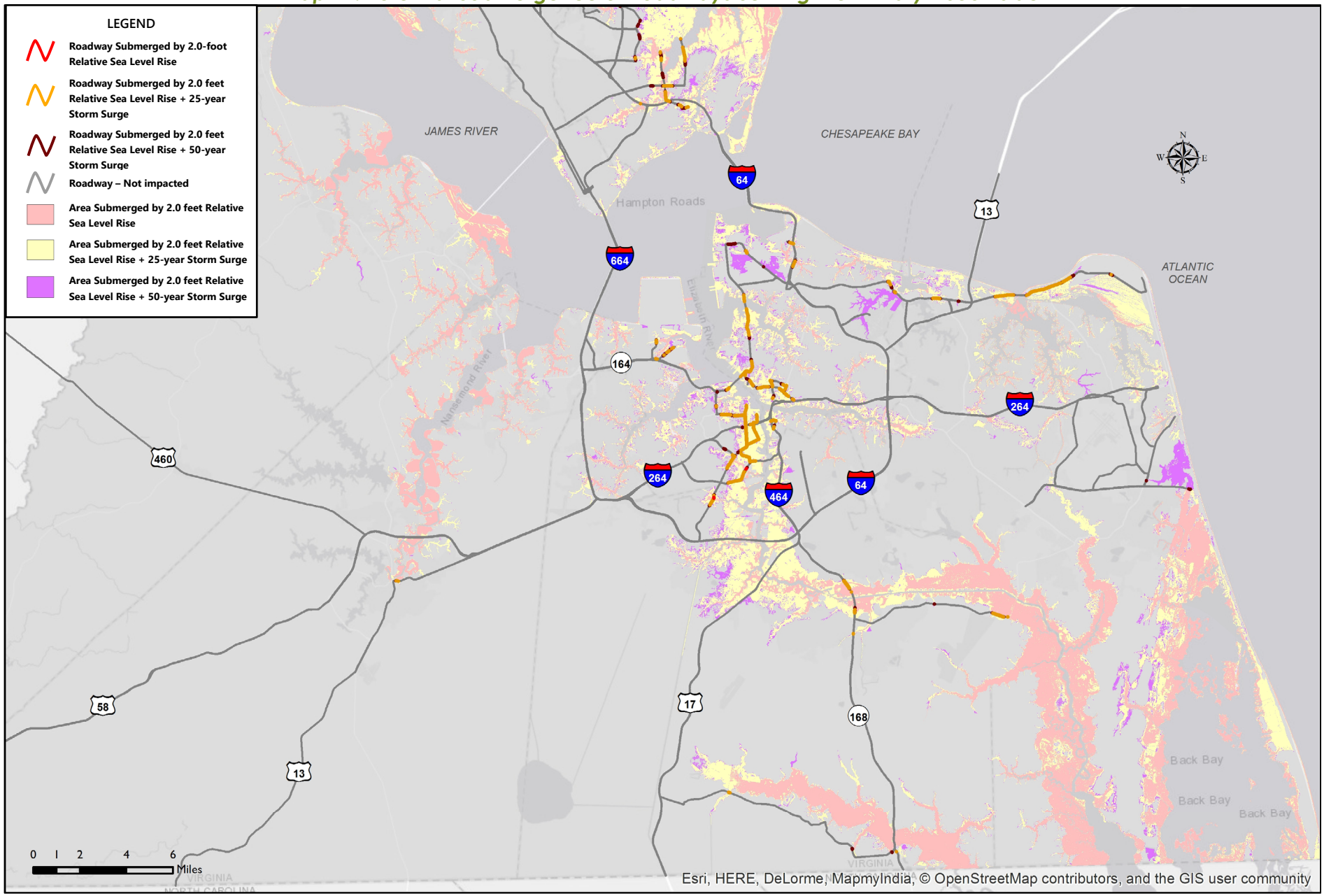
Map 40: Potential Submergence of Roadways Serving the Military - Peninsula



Prepared by: HRTPO Staff, December 2017

Data source for projected flooded areas: HRPDC Staff, October 2015

Map 41: Potential Submergence of Roadways Serving the Military - Southside



Prepared by: HRTPO Staff, December 2017

Data source for projected flooded areas: HRPDC Staff, October 2015

The integration of special stakeholders, such as the military, into the metropolitan transportation planning process can be a challenging but rewarding experience. For Hampton Roads, the local military represents a unique component of the region comprising a large portion of the population with a tremendous impact on the regional economy. Solving issues pertaining to military transportation needs within Hampton Roads is critical to the local military's success. An efficient regional transportation infrastructure not only affects the quality of life for local military personnel, but is important to our national security as well.

It is important for regions with a military presence to engage local military leaders and maintain a cooperative exchange of information. A partnership between the military and transportation stakeholders takes time to develop and strengthen. By providing a thorough assessment of the military's views on this vital topic to an MPO Board, MPO staff can enable that Board to respond to those views.

The *Military Transportation Needs Study* has received both local and statewide interest and recognition as a result of the findings, recommendations, and potential impacts on the military. The study bridges the gap between MPOs, DOTs, local communities, and military installations that currently exists for many metropolitan areas throughout the country. Very few MPOs have taken steps to incorporate the military into the planning process; this study builds on the current relationships already established with the local military and expands the list of military and supporting sites as well as roadways serving the military, which are now included as part of the Project Prioritization Tool. Mr. Glen Harrison, TRB Military Transportation Committee Chair, said "the outreach of your TPO to the military community to collaborate on regional transportation planning is a model for other locations to follow."

Downtown Portsmouth Near Naval Medical Center
Portsmouth During Nor'Easter in November 2009

FREIGHT ISSUES

FREIGHT CHALLENGES

Freight transportation influences every aspect of our daily lives and keeps our businesses and industries competitive in the local and global economy. While Hampton Roads and the Commonwealth of Virginia have established an integrated multimodal freight system that facilitates the efficient, reliable, and safe movement of freight, our challenge will be to maintain and expand the system to meet the needs of tomorrow. Throughout the world, online shopping has grown exponentially and is expected to continue to grow. This growth in electronic commerce is attributed to competitive pricing, faster delivery, easier return policies, improved transaction security, free shipping, and an increase in the type of goods available. According to statista.com, retail e-commerce sales including digital services amounted to $343 billion US dollars in 2015 and are projected to grow to $684 billion US dollars in 2021. People are becoming more and more accustomed to buying and receiving goods in a convenient and timely fashion. This increase will require better connections and a more efficient transportation system to transport our goods and products.

The volume and delivery of freight has grown significantly over the last few decades and is expected to rise even more soon. According to U.S. DOT's National Freight Strategic Plan (NFSP)[1], the U.S. economy is expected to double in size over the next 30 years. By 2045, the nation's population is projected to increase to 389 million people, compared to 321 million in 2015. To support this economic and population growth, freight movements across all modes are expected to grow by approximately 40% by 2045.[2] Container traffic at ports will increase steadily as the volume of imports and exports transported by our freight system more than doubles over this period. Air freight is expected to triple in response to demand for quick transport of high-value merchandise, while multimodal shipments are predicted to more than double.

All metropolitan areas are impacted by the movement of freight to some degree; the Hampton Roads region, however, experiences it much more intensely than many regions. Hampton Roads' Mid-Atlantic location makes it an ideal base from which to serve the large consumer and industrial markets located along the United States East Coast. According to the Hampton Roads Economic Development Alliance, Hampton Roads is located within 40% of the U.S. population and has access to approximately 128 million consumers within one day's drive.[3]

Map 42: Hampton Roads Mid-Atlantic Location

Source: Hampton Roads Technology Council

Hampton Roads is a multimodal region that includes ports, airports, rail, private trucking, shipping, and warehouse distribution facilities, as well as a network of road and rail corridors for the delivery of freight, goods, and services. Hampton Roads is home to the Port of Virginia's deep-water marine terminals. According to their 2019 Annual Report, the Port was instrumental in creating more than 2,800 jobs, generating more than $2 billion in investments, and developing 2.9 million square feet of new space. In order for Hampton Roads to remain competitive in attracting new business interests and continue to grow economically, its transportation network must facilitate the rapid and efficient movement of raw materials and finished products using trucks, trains, ships, and planes.

Port of Virginia

The Port of Virginia is comprised of four facilities in Hampton Roads: Norfolk International Terminals, Newport News Marine Terminal, Portsmouth Marine Terminal, and the Virginia International Gateway (VIG) Terminal in Portsmouth. The Virginia Port Authority also manages the Port of Richmond and owns an inland port facility near Front Royal. In addition, there are

1 Draft National Freight Strategic Plan for Public Comment, U.S. Department of Transportation, Federal Highway Administration, version 1, October 15, 2015.
2 Freight Analysis Framework, U.S. Department of Transportation, Bureau of Transportation
3 Statistics and Federal Highway Administration, version 4.1, 2016. http://www.hreda.com/map-center/?map=majorcities, April 2016.

several private terminals in the region, such as Lambert's Point Docks and Elizabeth River Terminals.

The Hampton Roads harbor facilities provide the deepest water access on the U.S. East Coast and is home to the world's largest naval base, a robust shipbuilding and repair industry, a thriving export coal trade and the sixth largest containerized cargo complex in the United States.

In May 2017, the first 13,000 TEU vessel (see COSCO Development photo) served the Port of Virginia – Virginia International Gateway, representing the beginning of a new era for Virginia and the U.S. East Coast. With the completion of the Panama Canal expansion in 2016 and other East Coast projects to raise navigational clearances in 2017, additional larger vessels are calling at Virginia's ports. The net effect is fewer vessel calls, but with larger amounts of containers that are discharged and loaded with each ship call resulting in surges that must be rapidly transferred from the ship/marine terminal and transported over road/rail connections. In the past, ships that have called Hampton Roads have unloaded or loaded between 1,000 and 1,500 containers. With these larger vessels, approximately 4,000 containers can be transferred during their stay at the Port.

The Port of Virginia's channels (50 feet) are among the deepest on the East Coast, and the only port authorized to be deepened to 55 feet. Virginia's deep channels have historically attracted first-in/last out services that require deeper sailing drafts when fully loaded. In addition, the Port of Virginia is the only US east coast port that is not air draft constrained due to its use of tunnels – instead of bridges across the navigable channels. This is a strength, but also a source of road congestion, that creates bottlenecks at tunnel approaches.

The Virginia Maritime Association and the College of William & Mary conducted a study[4] to assess the economic and fiscal impacts of Virginia's commercial ports and maritime industry. This was an independent report that documents the impacts of both domestic and international commerce through Virginia's ports and related activities in Fiscal Year 2013.

In Virginia, the maritime industry contributed to the direct employment of 296,100 and $56 billion in spending for goods and services. The following graphic shows the positive impacts of maritime activity in Virginia in terms of spending, wages, taxes collected, jobs supported, amount of cargo moved, and contributions to Virginia's gross state product.

According to the study, the backbone of Virginia's maritime industry centers on innovation, specialized services, integration, and adaptation to a changing environment while creating high paying jobs and supporting the Commonwealth's commerce regionally and worldwide.

Railroads

Rail is one of the primary methods of transporting goods to and from the Port of Virginia. In 2009—at the height of the economic downturn—231,000 containers handled at the Port were transported by rail. By 2018, this level had more than doubled, up to 552,318 rail containers. The share of containerized cargo handled by the Port of Virginia has also shifted towards rail. In 2018, 35% of all general cargo handled by the Port was transported by rail, up from 24% in 2006.

Port officials expect the amount of freight handled by rail to continue to increase. According to the Master Rail Plan (2015), the Port of Virginia projects that it will transport nearly 1,000,000 containers by rail by the year 2040, double what was handled by the Port in 2016. Port officials have also stated that they expect to have the capacity to transport up to 45% of containers by rail in a 20-year horizon if improvements continue to be made to the rail network.

Two Class I railroads, CSX and Norfolk Southern, serve the Port of Virginia via on-dock intermodal container transfer facilities at VIG Terminal in Portsmouth and Norfolk International Terminals. Rail service is further supported by short line rail partners—Norfolk & Portsmouth Belt Line and the Commonwealth Railway.

4 Economic Impacts of Virginia's Maritime Industry, Virginia Maritime Association, Prepared by Raymond A. Mason School of Business, William & Mary, February 2016.

$2.7 BILLION IN STATE/LOCAL TAXES

530,800 JOBS

%88.4 BILLION IN SPENDING

10.1% OF VIRGINIA GROSS STATE PRODUCT

$27.4 BILLION IN WAGES

79 MILLION TONS OF CARGO MOVED

Trucks

Trucks are the primary mover within the Hampton Roads transportation system and are responsible for delivering a majority of what local citizens consume and use daily – groceries, gas, clothes, and medicine. Roadway congestion adds to the operating costs of companies and shippers, impacting the economic competitiveness of the Port of Virginia, Hampton Roads, and the state of Virginia. For Hampton Roads to remain competitive in attracting new business interests and continue to grow economically, its transportation network must facilitate the movement of products using trucks.

According to IHS Transearch—a commercial freight demand and commodity flows database—total tonnage moved by truck in Hampton Roads is expected to double from 75 to 148 million tons between 2012 and 2040. Similarly, the modal share for trucks is expected to increase from 51% to 66%. For this reason, it is imperative for the region to improve the highways most used by the trucking industry in future years.

FREIGHT STRATEGIES

In 2016, a new tube opened at the Midtown Tunnel and widening of a section of Route 17 in York County was completed. Construction has also been completed on the first two phases of I-64 on the Peninsula as well as the first two phases of I-64/I-264 Interchange. By 2025, widenings of the Hampton Roads Bridge-Tunnel, I-64 on the Peninsula, I-64 in Chesapeake, and Holland Road in Suffolk should be completed.

Despite these projects that will address freight deficiencies, no funds have been identified for two highway corridors that serve as key Hampton Roads gateways: 1) I-64 for 29 miles between Hampton Roads and Richmond and 2) a limited-access route connecting Hampton Roads and I-95 along Route 58 or the potential I-87 Interstate corridor.

Port officials and other freight stakeholders in the region have expressed the desire for a limited-access connection between Hampton Roads and I-95 either along the existing Route 58 corridor (to Emporia) or along the potential I-87 corridor (to Rocky Mount, NC). The Route 58 corridor is the second-heaviest freight gateway to and from the region (4,100 trucks per weekday). Congestion, safety, and access management are some of the concerns along the existing Route 58 corridor. Speed limits range from 35 mph to 60 mph, and there are a number of traffic signals. Funding is in place to widen a 3.1-mile section of Route 58/Holland Road in Suffolk from 4 to 6 lanes and provide intersection upgrades. While this project will improve freight movement, a long-term, corridor-wide solution is still necessary. Recently, a *US 58 Arterial Preservation Plan* was completed that analyzed needs along the corridor, providing recommendations. Federal and state officials have authorized an "Interstate 87" designation for the US 64/17 corridor from Raleigh to Hampton Roads via Rocky Mount, Williamston, and Elizabeth City in northeastern North Carolina. Despite the tremendous value of providing a limited-access connection between Hampton Roads and I-95 via either the Route 58 or proposed I-87 corridors, no funding has been identified for the construction of either improvement.

In 2009, 231,000 containers handled by the Port of Virginia were moved by rail. By 2016, this level had more than doubled to over 550,000 rail containers. Port officials expect the share and amount of containers transported by rail to continue to increase as demand rises, up to nearly 1 million containers by rail by the year 2040. In order to keep Virginia competitive and ensure the ability to handle anticipated rail volumes, the Port of Virginia, rail stakeholders, and state/local officials must work together to secure grant dollars, such as the Rail Enhancement Fund and federal grants, for rail improvement projects. Examples of rail improvement projects include on-dock improvements as part of the NIT South project and the National Gateway project, which includes improvements to the Virginia Avenue and Howard Street tunnels to allow for double-stacked trains. Funding improvements for highway-rail crossings – such as the crossing at the Hampton Boulevard/International Terminal Boulevard intersection that has been supported by the Navy and Port of Virginia officials – will also be critical with the increased number of trains impacting congestion levels and safety at major crossings.

The Port of Virginia is making investments—both short-term and long-term—in anticipation of increased freight demand. In anticipation of future freight growth, the Port of Virginia (POV) has developed a 2065 Master Plan. This

plan integrates these growth opportunities into updated demand forecasts and aligns the port's capital improvement project schedules to enable the port to handle it.

Improvement projects and efforts for the Port of Virginia include:

- Upgrading container handling equipment that will increase capacity (e.g. advanced equipment at Norfolk International Terminals)
- Expanding and optimizing Virginia International Gateway
- Promoting the Port of Virginia's inland access points
- Reinforcing near-term operations to alleviate construction activities and congestion
- Continuing the expansion of the Craney Island Marine Terminal
- Investment at Richmond Marine Terminal to upgrade the equipment and facilities
- Reinvesting in Portsmouth Marine Terminal and Newport News Marine Terminal for non-containerized cargo services
- Deepening of navigation channels to support ultra large container vessels (ULCVs)
- Encouraging critical rail and highway improvements that will improve access to Port of Virginia terminals.

Since 2009, HRTPO staff has worked with regional freight stakeholders through the Freight Transportation Advisory Committee (FTAC), which advises the HRTPO Board on freight issues. Key freight business and community leaders participate on FTAC and have provided vital freight input for several HRTPO Board decisions. Staff remains committed to working with FTAC to help raise awareness of the importance of freight transportation to the region and to collect input from various stakeholders—including the public—on these matters.

The Freight Transportation Advisory Committee (FTAC) has stated that implementing system-wide projects that keep cargo moving along the entire length of corridors is important. Both widening the 29-mile gap along I-64 and providing a limited-access east-west connection to I-95 would provide system-wide benefits. HRTPO staff and other regional freight stakeholders will need to monitor the impact of regional transportation projects on truck travel patterns in order to address deficiencies in the transportation system.

HRTPO will continue to integrate freight into the Hampton Roads Long-Range Transportation Plan (LRTP), the blueprint for the region's multimodal transportation development. HRTPO freight studies feed directly into the LRTP process and provide freight-related inputs for the Project Prioritization Tool, which is used to score transportation projects in order to assist decision makers with project selection. HRTPO staff will incorporate the latest freight data and performance measures into the tool as they become available.

HRTPO staff has established and maintained a close working relationship with the Virginia Department of Transportation's (VDOT) Transportation and Mobility Planning Division and the Hampton Roads District for all statewide freight planning initiatives. HRTPO staff will continue to work with the state on statewide freight initiatives, such as VTrans, the Virginia Multimodal Freight Plan, and freight committees. Additionally, the HRTPO plans to work with the state and peer MPOs to establish a network of Critical Urban Freight Corridors (CUFCs) in Virginia. These roadways should provide connections between the Interstate System and other important ports, public transportation facilities, or other intermodal freight facilities.

One of the largest challenges facing the freight industry within the Commonwealth of Virginia is the availability of parking for trucks. This is not only a statewide problem, as Hampton Roads also has a parking deficit, according to VDOT. Due to these parking deficits, regional leaders should continue to work with VDOT and other freight stakeholders to improve these deficiencies.

Truck Traveling on Hampton Boulevard Toward the Midtown Tunnel

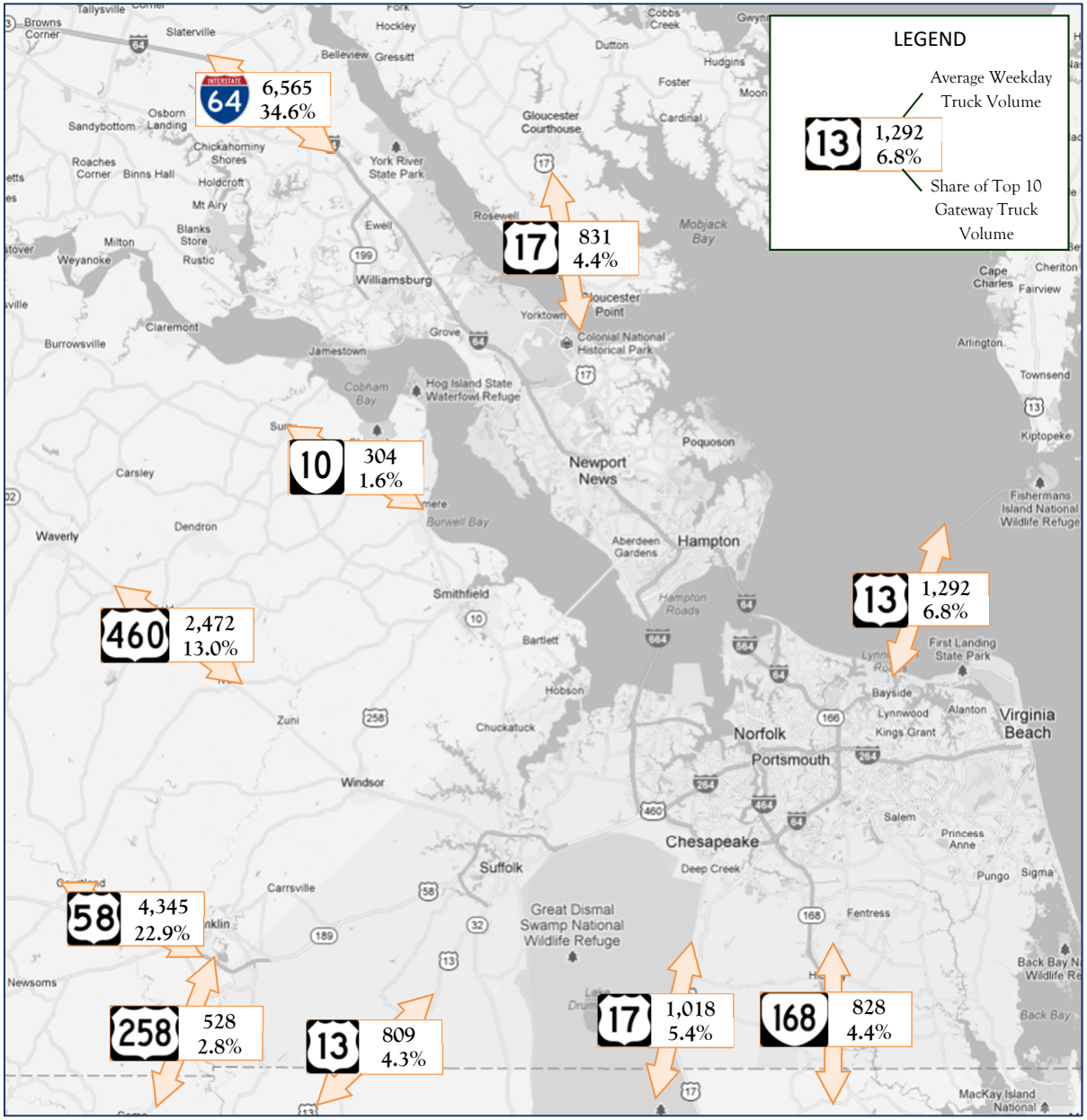
Hampton Roads Regional Freight Study (July 2017)

Starting with the ISTEA legislation, Congress has encouraged the consideration of freight movement and intermodal connectivity in statewide and metropolitan transportation planning processes. As a result of this emphasis, the HRTPO began a series of regional freight studies in the early 1990s, and released the region's first report in 1996. Updates to the Hampton Roads Regional Freight Study were released in 1998, 2001, 2007, 2012, and 2017.

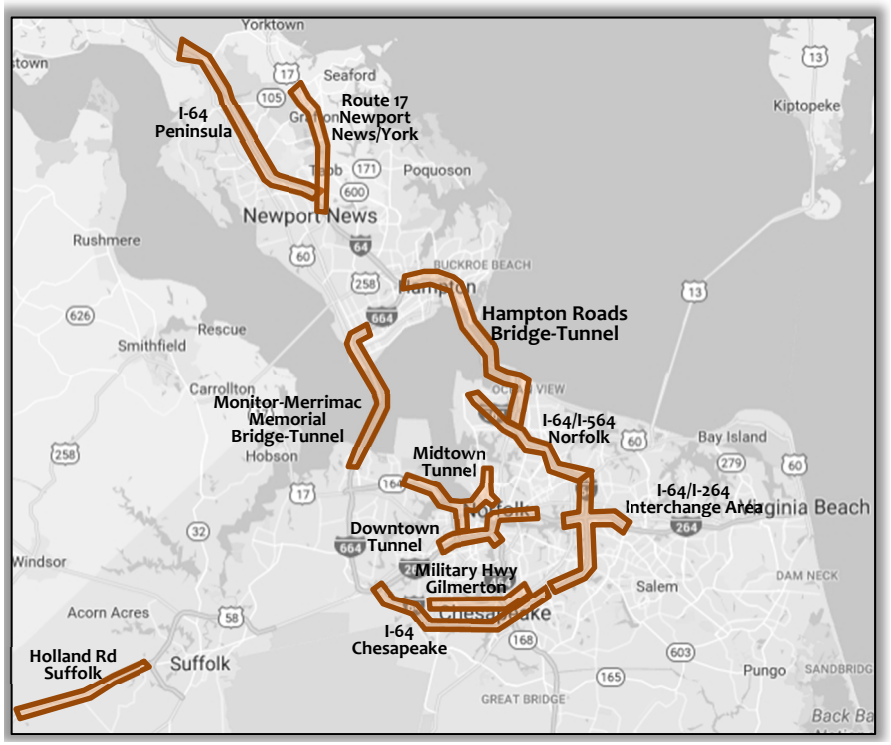
The 2017 update builds on previous efforts and is intended to inform freight policy, program, and investment decisions in the Hampton Roads region, which will impact the greater Commonwealth of Virginia. This report details the movement of goods across all freight facilities—highways, ports, railways, and airports. Special emphasis is placed on freight moving by trucks across highways as they serve as the predominant mover of freight.

The overall purpose of this study is to understand the impact of freight movement on regional and statewide employment, income, and economic growth in order to guide policy and investment decisions—particularly for prioritizing transportation projects—that will improve connectivity, efficiency, reliability, and safety of the Hampton Roads freight multimodal transportation system.

Map 43: Number and Share of Trucks Passing Through the Top 10 Regional Gateways Each Weekday, 2018



Source: HRTPO Analysis of VDOT and CBBT data

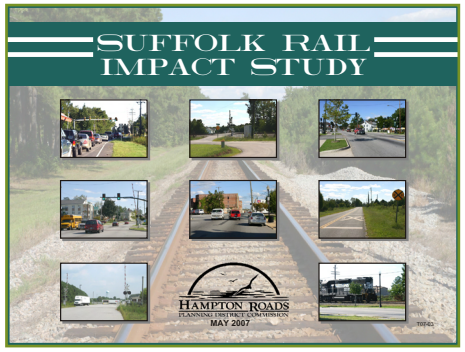


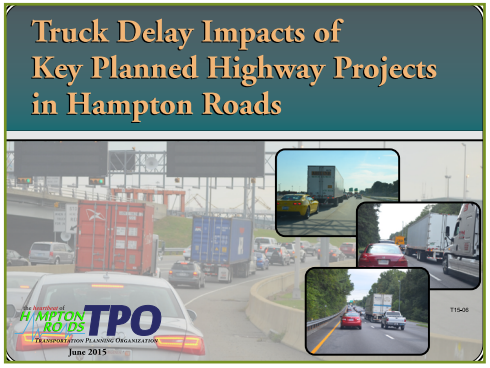
Map 44: High Profile Regional Corridors for Truck Delay

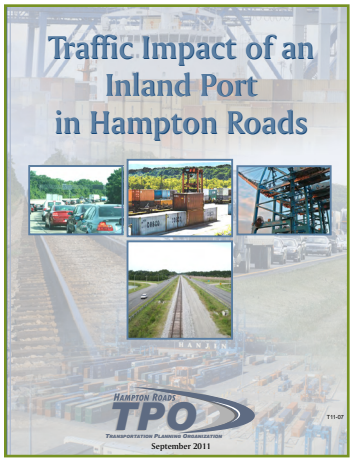
Table 1: Truck Delay in High Profile Regional Corridors, 2014

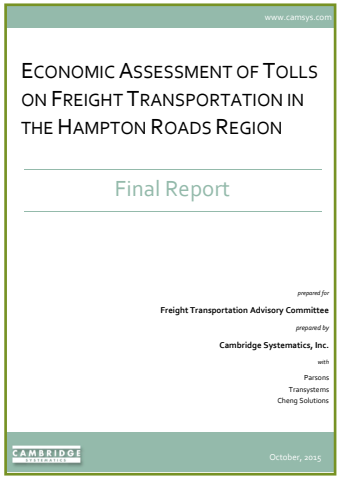
Corridor	AM Peak Period Truck Delay (hours)	PM Peak Period Truck Delay (hours)	Weekday Peak Period Truck Delay (hours)	Annual Peak Period Truck Delay (hours)	Annual Congestion Cost Incurred by Trucking Industry ($ millions)
Hampton Roads Bridge-Tunnel	24.18	56.59	80.76	20,191	$1.37
I-64 Chesapeake	21.06	42.24	63.30	15,824	$1.08
Downtown Tunnel	17.12	13.02	30.14	7,535	$0.51
I-64/I-564 Norfolk	13.09	16.49	29.58	7,396	$0.50
I-64/I-264 Interchange Area	12.45	16.67	29.12	7,280	$0.50
Midtown Tunnel	17.91	7.13	25.04	6,260	$0.43
Monitor-Merrimac Mem. Bridge-Tunnel	1.55	22.09	23.64	5,909	$0.40
I-64 Peninsula	5.77	13.79	19.56	4,890	$0.33
Holland Rd - Suffolk	6.23	10.42	16.65	4,163	$0.28
Route 17 - Newport News/York	3.68	4.28	7.95	1,989	$0.14
Military Hwy - Gilmerton	2.78	4.83	7.61	1,902	$0.13

Source: HRTPO Analysis of INRIX , VDOT, CBBT, and SNJB data









Other HRTPO Freight-Related Studies

Suffolk Rail Impact Study (May 2007)

This study analyzes the impacts to 31 at-grade highway-rail crossings in Suffolk, Virginia that were expected to see increased rail traffic due to new port facilities in Hampton Roads. Performance measures were used to evaluate the effects of this traffic on mobility and safety. Based on the analysis using these performance measures, the crossings were ranked and improvements were prioritized.

Traffic Impact of an Inland Port in Hampton Roads (September 2011)

This purpose of this study was to examine the expected impact that an inland port facility located in the western area of Hampton Roads would have on regional roadway travel and congestion. This analysis showed that an inland port may do little to lower regional travel levels. For existing conditions, weekday truck volumes would only be expected to decrease between 1.0% and 2.1% under the various scenarios, with total regional volumes only decreasing between 0.04% and 0.08%. These changes would be even lower during the busiest travel hour in the afternoon, and there would also be no changes in regional congestion levels with the inland port, regardless of scenario.

In 2030, the facility would be expected to have a larger impact, but still do little to lower regional travel levels. Weekday truck volumes would be expected to decrease between 2.2% and 4.4%, with total regional travel only decreasing between 0.10% and 0.19% under the various scenarios.

There would therefore be very little change in regional congestion levels, and in some scenarios would even lead to additional congestion around the inland port site in Isle of Wight County.

Existing and Future Truck Delay (September 2013)

This study builds on the analysis of existing truck volumes and delays contained within the 2012 Hampton Roads Regional Freight study to include future truck volumes and delays by location in Hampton Roads. It uses the new truck component and time-of-day capability of the regional travel demand model to forecast truck volumes and congestion to be faced by trucks in the next 20 years. This is the first time that HRTPO staff has forecasted future truck traffic or truck delays. The results of this analysis include future roadway segments with the highest total weekday truck delays.

Based on the results of this study, the HRTPO refined the Project Prioritization Tool for the LRTP. For example, previous versions of the Tool awarded points to projects using generalized measures of "high", "medium", and "low" impact on truck movement and reduction of travel time to ports. The Tool has been updated to award points based on reduction of truck delay (weekday hours/mile) from this study, which is a more refined, quantitative measure.

Positioning Hampton Roads for Freight Infrastructure Funding (March 2014)

MAP-21, the previous federal surface transportation authorization program, emphasized roles for states, MPOs, and other stakeholders in freight planning. States and MPOs that are organized, with data and analyses, will be in a better position to benefit from the next authorization. At the time this study was conducted, final designation of the National Freight Network had not been established.

In order to assist the Commonwealth of Virginia and the United States in preparation of this effort, this study identified a base network of highways within Hampton Roads that were anticipated to be part of the National Freight Network. It also evaluated the condition and performance of those same highways and determined freight bottlenecks and major trade gateways to strategically position the state and the Hampton Roads region for future freight infrastructure funding initiatives.

Truck Delay of Key Planned Highway Projects in Hampton Roads (June 2015)

This study builds on the work contained within the 2013 Existing and Future Truck Delay in Hampton Roads study, measuring future truck delay impacts in the next 20 years for six key planned highway projects. It estimates total weekday truck delay for the region and by corridor in the next 20 years for seven scenarios—a base future roadway network scenario and six additional scenarios containing the base future roadway network and one of the following key highway projects:

- I-64 Peninsula Widening (including Segments 1-3 and Fort Eustis Blvd Interchange)
- I-64 Southside Widening (including replacement of High Rise Bridge)
- I-64/I-264 Interchange (including Witchduck Rd Interchange)
- Route 58 (Holland Rd)
- Third Crossing (including Patriots Crossing, Craney Island Connector, and I-664 Widening/Bowers Hill Interchange)
- US 460/58/13 Connector (including SPSA and Hampton Roads Executive Airport Interchanges)

The purpose was to test and measure the impact of each highway project on truck delay for the total roadway network and along major corridors in the vicinity of each project location.

Economic Assessment of Tolls on Freight Transportation in the Hampton Roads Region (October 2015)

In response to freight industry concerns regarding tolling as a funding mechanism from improving and expanding existing infrastructure, FTAC, with the support from VDOT and the HRTPO, commissioned a study to examine the economic implications of proposed highway improvements and the use of tolls to fund those improvements.

Major finding from the study include:

- Freight rates in region are generally competitive with peer ports.
- Without the proposed major regional capacity projects there will be an additional 11,060 hours of truck delay daily, translating into more than 4 million additional hours of truck delay in 2040. This increase in truck delay gives rise to significant increases in trucking costs.
- The cost of doing nothing is significant. It is estimated that business

as usual (BAU) will lead to nearly $1 billion increase in trucking costs in 2040. This includes driver and non-driver based costs as well as the cost of reduced number of turns for local drayage operators.

- 57% of the increased cost ($552.2 million) under the BAU scenario will be borne by local truck trips.
- Based on current trends in tolling rates, the freight industry will be better off building new capacity on key truck routes with tolls than not making the investment. The net benefit to the freight industry of making the proposed infrastructure investments and using tolls (at the current rate plus inflation) to fund them is about $174 million in 2040.
- Both tolls and congestion costs impact local trips more that trips originating or terminating outside the region. It is estimated that local truck trips will incur about 57% of the total congestion costs under the BAU and they will pay about 66% of the tolls under the Build with Tolls scenario. It should be noted that FTAC members have indicated that there should be equity between intra-regional trips and trips that have origins or destinations outside of the region.
- If tolls rise above $22 per trip in 2040 for local trucks, the costs of tolls start to exceed the congestion relief benefits. That equates to about $7.30 in current dollars.

More information on these HRTPO freight studies is available at http://www.hrtpo.org/page/freight.

Freight Transportation Advisory Committee (FTAC)

In 2009, the HRTPO Board created the Freight Transportation Advisory Committee (FTAC) to provide an opportunity for the freight industry to participate in and contribute to the regional transportation planning process. The FTAC mission is to advocate on behalf of the systematic needs for the transport and movement of freight in the region.

According to HRTPO bylaws, "The FTAC will conduct public outreach activities that help TPO efforts to explain and help raise awareness of the importance of freight transportation to the region and to collect region-wide public input on these matters." Key freight business and community leaders in Hampton Roads have recognized that efficient freight transportation is a key factor in statewide and metropolitan economic competitiveness and have willingly served on FTAC since its establishment in 2009.

The FTAC consists of nine members, eight from private industry plus one HRTPO board member who serves as one of two FTAC Co-Chairs. The HRTPO Chair appoints one of the eight private sector FTAC members as the other FTAC Co-Chair, who thereby also serves as a non-voting member of the HRTPO Board. The Virginia Port Authority (VPA) and HRTPO staff work together to handle the administration of FTAC (agendas, minutes, etc.).

FTAC has assisted in many important activities since its creation, including:

- Providing input and technical guidance to HRTPO staff on planning efforts such as the Regional Freight Study and other freight-related studies
- Passed a resolution supporting a future Interstate designation for the Hampton Roads to Raleigh Highway Corridor
- Assisted with the *Economic Assessment of Tolls on Freight Transportation in the Hampton Roads Region* study
- Provided input during the development of the 2040 and 2045 LRTPs including providing candidate projects suggestions, project data, and input on project prioritization measures

Please refer to the FTAC webpage to learn more about the committee and its accomplishments.

TOURISM ISSUES

TOURISM CHALLENGES

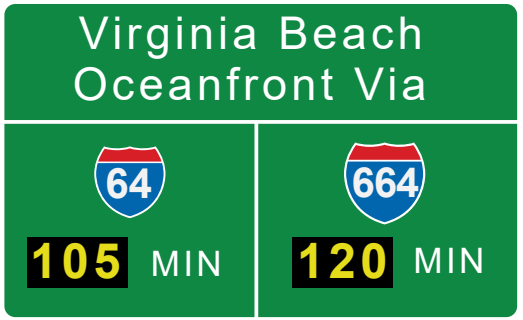
Few metropolitan areas can compete with Hampton Roads in the number of tourist attractions – which include the Virginia Beach Oceanfront, Colonial Williamsburg, Busch Gardens, Jamestown, Yorktown Battlefield, Nauticus and the Battleship Wisconsin, the Mariners Museum, Virginia Air and Space Center, and many other attractions. In addition, many tourists heading to the Outer Banks pass through Hampton Roads.

Colonial Williamsburg

Largely due to the influx of tourists, traffic volumes are higher in the summer months in Hampton Roads than at other times of the year, particularly on weekends. These volume increases are particularly noticeable on major routes into and out of the region, such as I-64 on the Peninsula, the Chesapeake Bay Bridge-Tunnel, and the Chesapeake Expressway. Congestion is common on summer weekends at the Hampton Roads Bridge-Tunnel, the I-64/I-464/ Chesapeake Expressway Interchange in Chesapeake, and the stretch of I-64 between Hampton Roads and Richmond.

TOURISM STRATEGIES

Several strategies are in place to improve the traveling experience for tourists, including:



Reach the Beach Signage

Reach the Beach – VDOT created the "Reach the Beach" initiative to improve the overall traveler experience by providing information at key decision points on the fastest routes to the Virginia Beach Oceanfront and to the Chesapeake Expressway for Outer Banks traffic. Real-time travel time information is provided for two routes on each sign so travelers have the option of choosing the quicker route.

The "Reach the Beach" initiative began in 2012, with the installation and activation of six signs. In addition, monitors were installed at Welcome Centers throughout Virginia – including the one on I-64 Eastbound in New Kent County to the west of Williamsburg – that display travel time information.

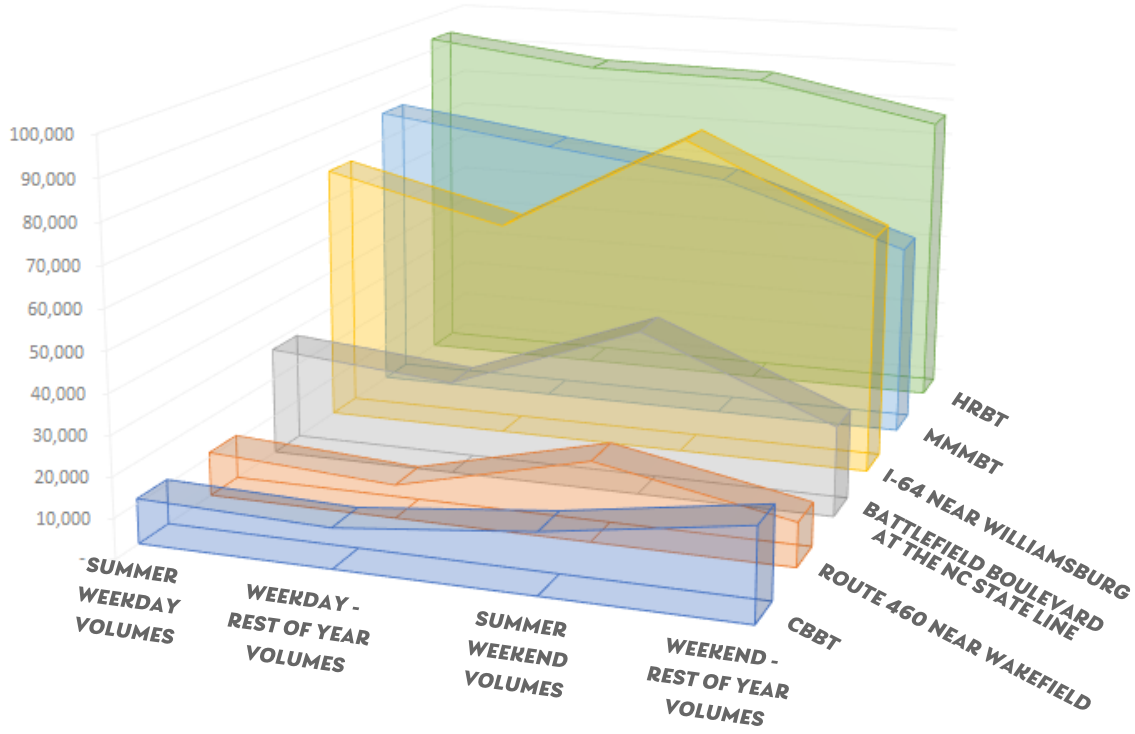
VDOT installed and activated three additional signs in 2015, detailing travel times on I-64 and alternate routes to I-295 near Richmond from locations in Chesapeake, James City County, and Virginia Beach.

As part of the "Reach the Beach" campaign, VDOT produced YouTube videos to encourage motorists to use I-664 and the Monitor-Merrimac Memorial Bridge-Tunnel when traveling to Virginia Beach or the Outer Banks.

VDOT has also created a "Reach the Beach" feature on the 511 Virginia phone app that provides real-time travel time information for multiple routes to and from Virginia Beach and the Outer Banks. As the user approaches key decision points, the voice feature notifies the user of the current travel times from that point to the chosen destination via various routes.

Traveler Information – As mentioned in the Operations section of this report, traveler information is provided through a variety of methods in addition to the "Reach the Beach" efforts. These methods include highway advisory radio, changeable message signs, the 511 Virginia phone service, website, and app, etc.

Figure 25: Summer and Non-Summer Volumes on Major Tourist Routes



Source: VDOT, CBBT

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CHAPTER 4: SYSTEM PRESERVATION, SAFETY, AND SECURITY

INFRASTRUCTURE PRESERVATION

As transportation infrastructure both throughout Hampton Roads and the country continues to age, ensuring it is maintained properly is an essential public responsibility. According to the American Society of Civil Engineers, the United States would need to invest $2.4 trillion by 2025 to maintain the existing aviation, road, bridge, waterway, rail, and public transportation systems throughout the country, the majority of which is unfunded.

This section addresses the maintenance and preservation of roadway pavement, bridges, and tunnels for the Hampton Roads region. Although not specifically addressed in this section, maintaining and preserving other transportation facilities and modes such as sidewalks, multi-use paths, ports, buses, and railroads is critical as well.

PAVEMENT CHALLENGES

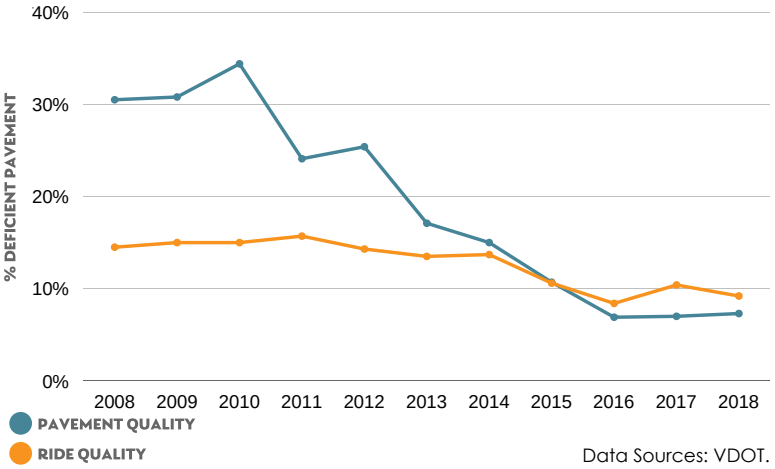
The deteriorating condition of I-264 in Norfolk and Virginia Beach made headlines in 2013, providing a high-profile example of the importance of funding infrastructure maintenance. Since then, the condition of state-maintained roadways has greatly improved in Hampton Roads.

VDOT annually collects data on the condition and ride quality of state-maintained roadways. Pavement condition describes the amount of pavement distresses – such as cracking, patching, and rutting – on each roadway. The Critical Condition Index (CCI) is a measure that is calculated based on these distresses, and pavement condition is rated as Excellent, Good, Fair, Poor, or Very Poor based on the CCI. Roadways that are in Poor or Very Poor condition are considered to be deficient, and VDOT has a goal that no more than 18% of Interstate and Primary roadway pavement condition be classified as deficient.

The percentage of state-maintained roadways in deficient condition in Hampton Roads has greatly improved in recent years. As recently as 2010, more than one third of state-maintained Interstate and Primary roadways in Hampton Roads had a deficient pavement condition. After extensive repaving efforts throughout the region, only 7% of state-maintained Interstate and Primary roadways in the Hampton Roads had a deficient pavement condition in 2018, with is better than any other area of the Commonwealth. Interstates in Hampton Roads have particularly improved, with only 2% having a deficient pavement condition in 2018.

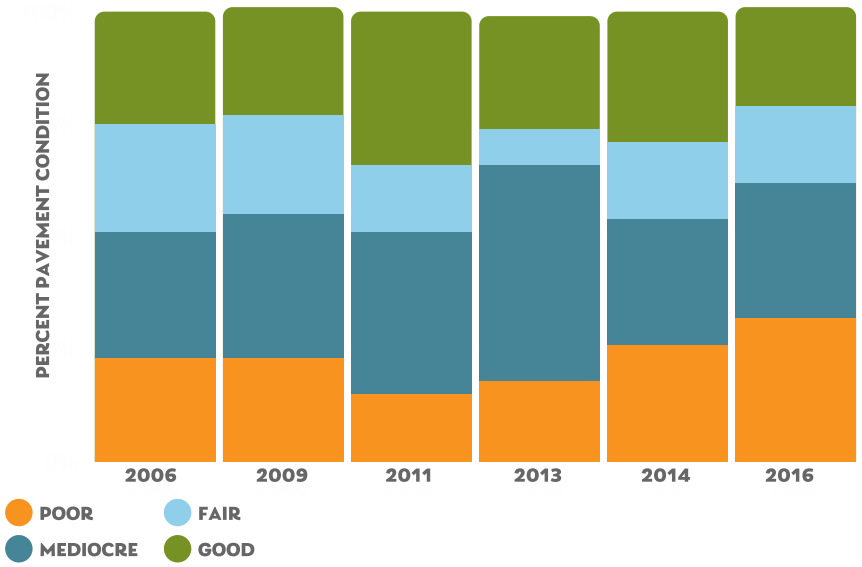
VDOT also collects data regarding the ride quality of roadway pavement. Ride quality describes the roughness of pavement based on a sum of the irregularities in the pavement surface. The International Roughness Index (IRI) is a measure that describes these irregularities, and ride quality is rated as Excellent, Good, Fair, Poor, or Very Poor based on the IRI. Roadways with a Poor or Very Poor ride quality are considered to be deficient, and VDOT has a goal that no more than 15% of Interstate and Primary roadways be classified as deficient in terms of ride quality.

Figure 26: Percent of VDOT-Maintained Interstate and Primary Roadway Pavement in Deficient Conditions in Hampton Roads



Data Sources: VDOT.
**Pavement classified as poor or very poor is considered to be deficient.*

Figure 27: Pavement Condition in Hampton Roads, 2006-2016



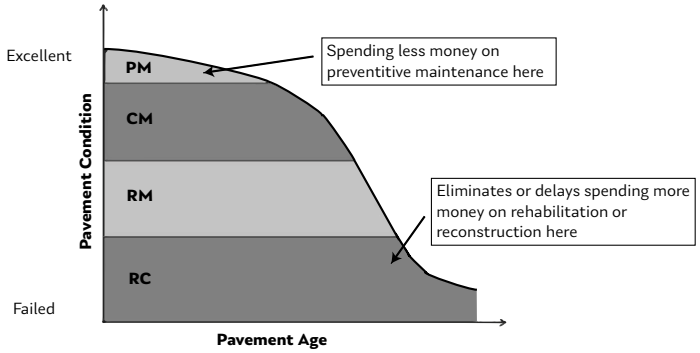
Source: TRIP. Data only includes Interstates, freeways, and other principal arterials

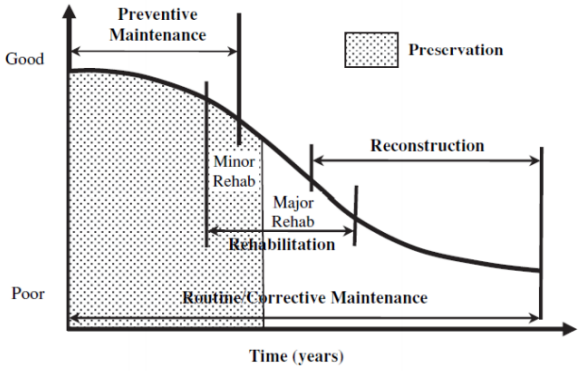
The ride quality of pavement in Hampton Roads has also improved in recent years. In 2018, 9% of state-maintained Interstate and Primary roadways in Hampton Roads had a deficient ride quality, down from 14% in 2014 and 16% in 2011.

The condition of pavements in metropolitan areas throughout the country is assessed by TRIP, an organization that researches, evaluates, and distributes economic and technical data on surface transportation issues. According to the most recent analysis from TRIP, 32% of the major roadways in Hampton Roads had pavement that was in poor condition in 2016. Another 30% of Hampton Roads roadways were rated as mediocre, 17% were rated as fair and 22% were rated as good. The percent of pavement in poor condition in Hampton Roads was higher in 2016 than it was at any point throughout the previous decade according to TRIP.

Among the 39 large metropolitan areas with populations between one and four million people, Hampton Roads ranked 14th highest in terms of the percentage of roadways with pavement in poor condition in 2016. San Jose had more than twice the percentage of major roadways in poor condition than Hampton Roads.

Figure 28: Pavement Deterioration Over Time





Source: Adapted from Peshkin et al. 2007. Source: VDOT

The substandard condition of pavement has a cost to users as well. These costs include increasing the frequency of needed maintenance, accelerating vehicle deterioration and depreciation, and requiring additional fuel consumption. According to TRIP, driving on substandard roadways cost each driver in Hampton Roads an additional $686 in 2016.

In the state of Virginia, cities are responsible for maintaining their own streets, including monitoring the condition and roughness of their pavements. Cities at least partially pay for maintaining streets though quarterly payments that VDOT makes to each locality as part of the Urban Maintenance Program. The levels of these payments are based on the number and type of lane-miles in each locality. These payments must be spent on maintenance activities, which includes maintaining pavement.

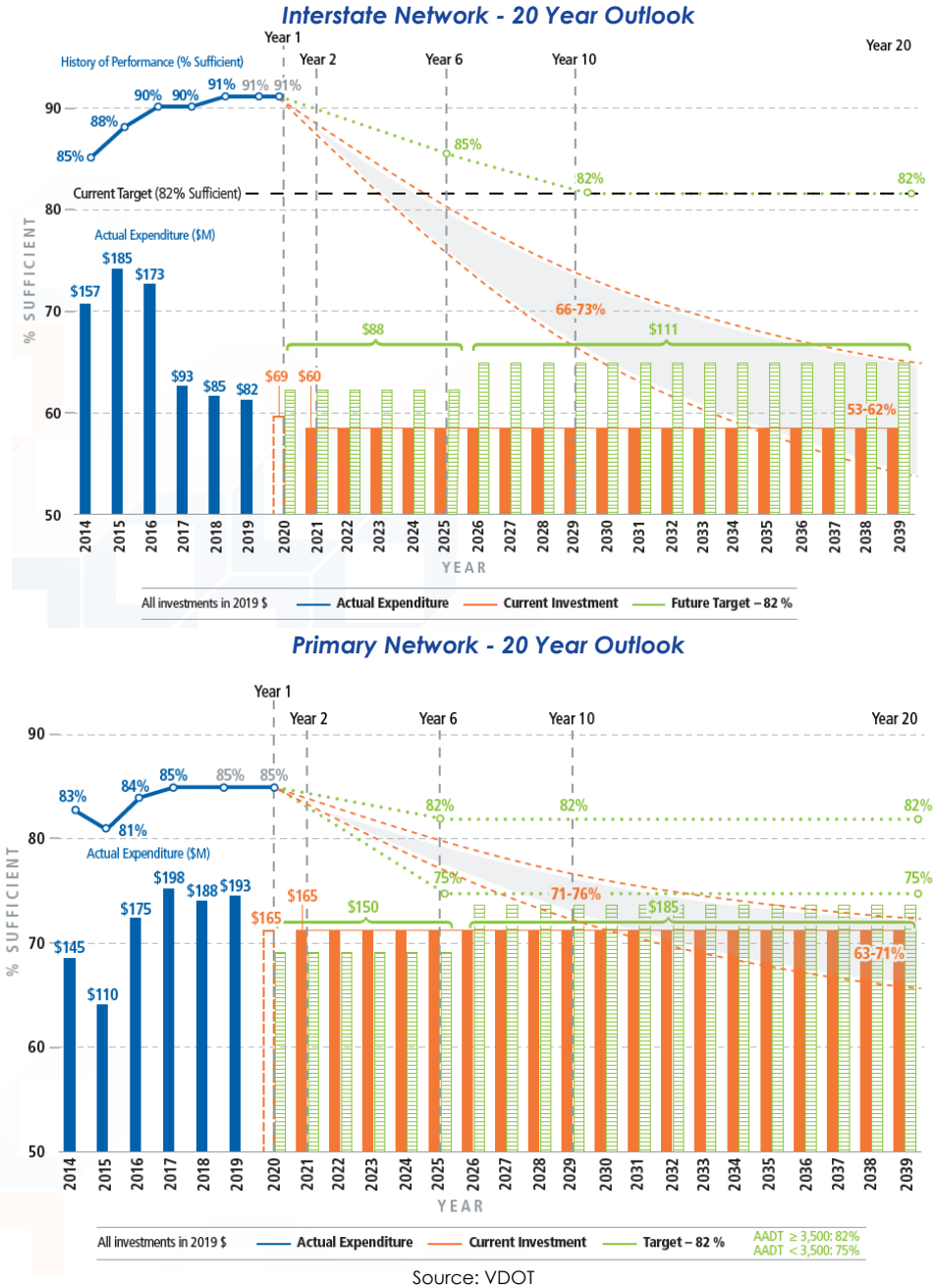
PAVEMENT STRATEGIES

The funding needed to keep roadway pavement in a state of good repair will continue to increase. Virginia House Bill (HB) 1887, which was signed into law in 2015, was created to address the shortfall in maintenance funding by directing a larger percentage of funding to maintaining roadways and replacing deficient bridges. HB 1887 replaced the allocation formula that provided funds based on the classification of the roadway (40% primary, 30% secondary, and 30% urban) with a formula that dedicates 45% of statewide transportation funds to the State of Good Repair program, which was created to rebuild deteriorated pavement and bridges. In addition to directing a larger percentage of funds to maintaining pavement, HB 1887 also created a priority ranking system for replacing deteriorated pavements.

However, even with the additional funding provided by HB 1887, more funding is still needed to maintain pavement in a state of good repair. According to VDOT, a sustained investment of an additional $143 million per year is needed over the next 20 years to meet the current statewide targets for a sufficient condition of Interstate, Primary, and Secondary roadway pavements. This annual figure does not include the additional funding needed to preserve those roadways within cities throughout the state.

Providing adequate funding for preventative maintenance of roadway pavement is essential. Timely preventive treatments can restore pavements to a Good or Excellent condition, which will avert the onset of the rapid deterioration commonly seen in poorly maintained pavements. Conversely, underinvesting in roadway maintenance causes delays in completing pavement improvements, which ultimately leads to pavement degradation that then requires more extensive and more costly treatments such as complete roadway reconstruction.

Figure 29: VDOT Past and Predicted Pavement Conditions



Source: VDOT

BRIDGE CHALLENGES

The large number of bays, rivers, and streams in the region makes bridges a vital part of the Hampton Roads transportation network. Adequately funding the maintenance of these structures, however, will be difficult as bridges in Hampton Roads continue to age.

There are 1,264 bridges* in Hampton Roads, ranging in size from small culverts to some of the longest structures in the world. The median age of bridges in the region is currently 41 years old, and 101 bridges (8%) are at least 70 years old.

All bridges in Hampton Roads are inspected regularly by qualified inspectors. Depending on the condition and design of each bridge, these inspections occur at intervals of two years or less. Based on these inspections, deficient bridges may be classified as "structurally deficient".

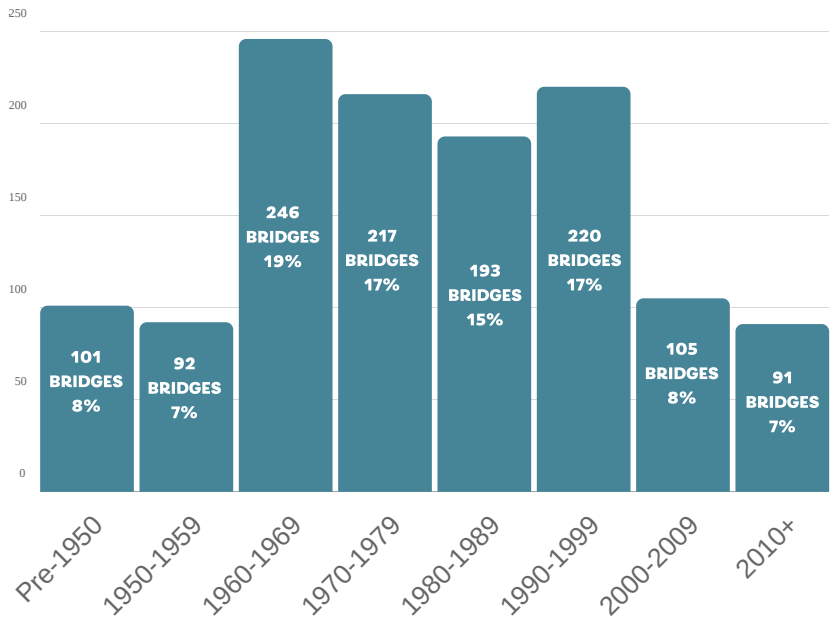
Structurally deficient bridges are structures with elements that need to be monitored and/or repaired. Structurally deficient bridges typically need to be rehabilitated or replaced to address deficiencies. It must be noted, however, that structurally deficient bridges are not necessarily unsafe, and bridge inspectors will close or impose weight limits on any bridge that is judged to be unsafe.

There were 60 bridges (4.7%) that were classified as structurally deficient in Hampton Roads as of April 2019. This is down from 71 bridges (5.9%) that were classified as structurally deficient in 2010, and down from a high of 80 bridges (6.6%) in 2014.

The percentage of bridges that are classified as structurally deficient in Hampton Roads is better than the average of other comparable metropolitan areas. Hampton Roads ranks 24th highest among 39 large metropolitan areas with populations between one and four million people in the percentage of structurally deficient bridges in each region.

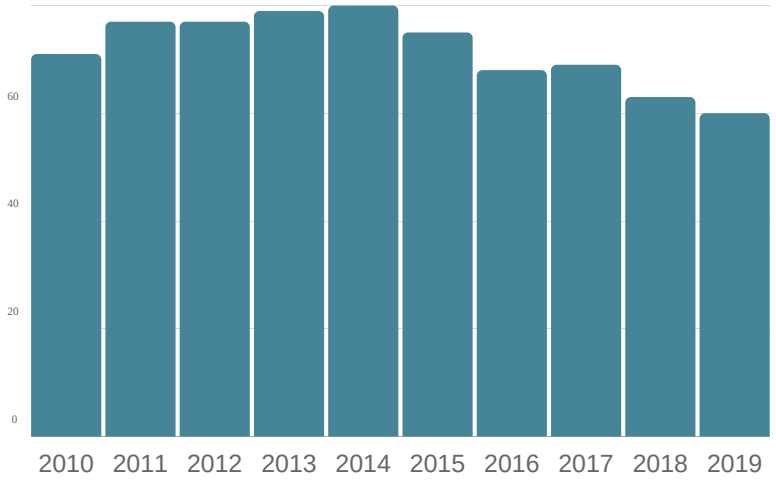
However, Hampton Roads ranks much lower in terms of the percentage of bridges that are classified in Good condition using federal standards. At 27.8%, Hampton Roads ranks 3rd lowest among the 39 comparable metropolitan areas between one and four million people in terms of the percentage of bridges classified as being in Good condition.

Figure 30: Bridges in Hampton Roads by Year Built



Data sources: VDOT, FHWA. Data as of April 2019.

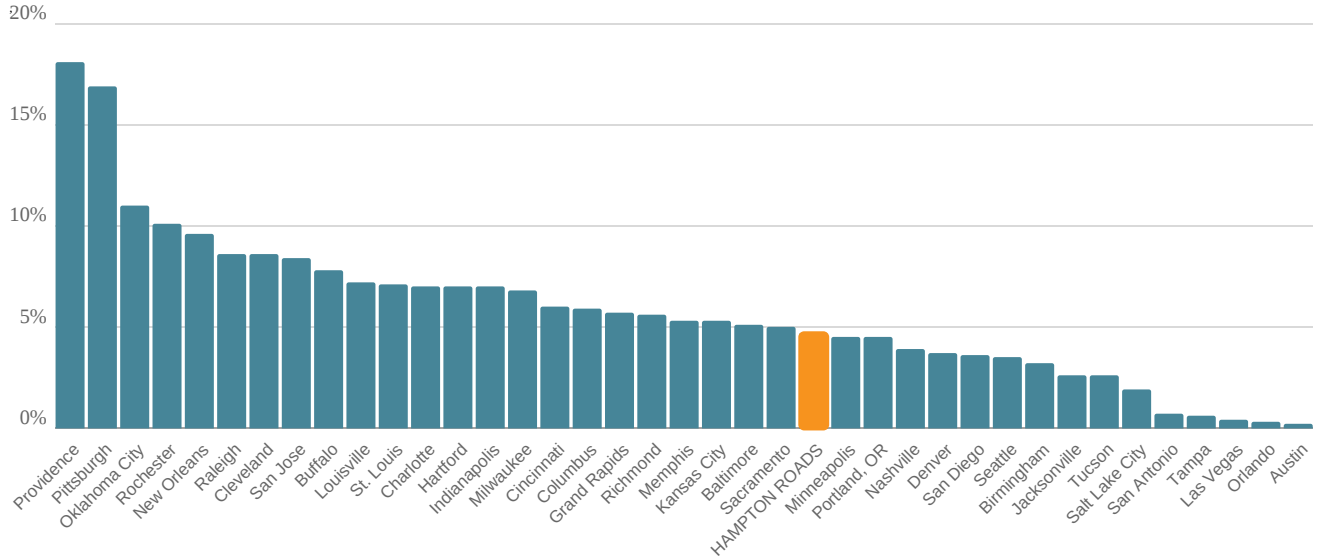
Figure 31: Structurally Deficient Bridges in Hampton Roads, 2010-2019



Data sources: VDOT, FHWA. Data as of April 2019.

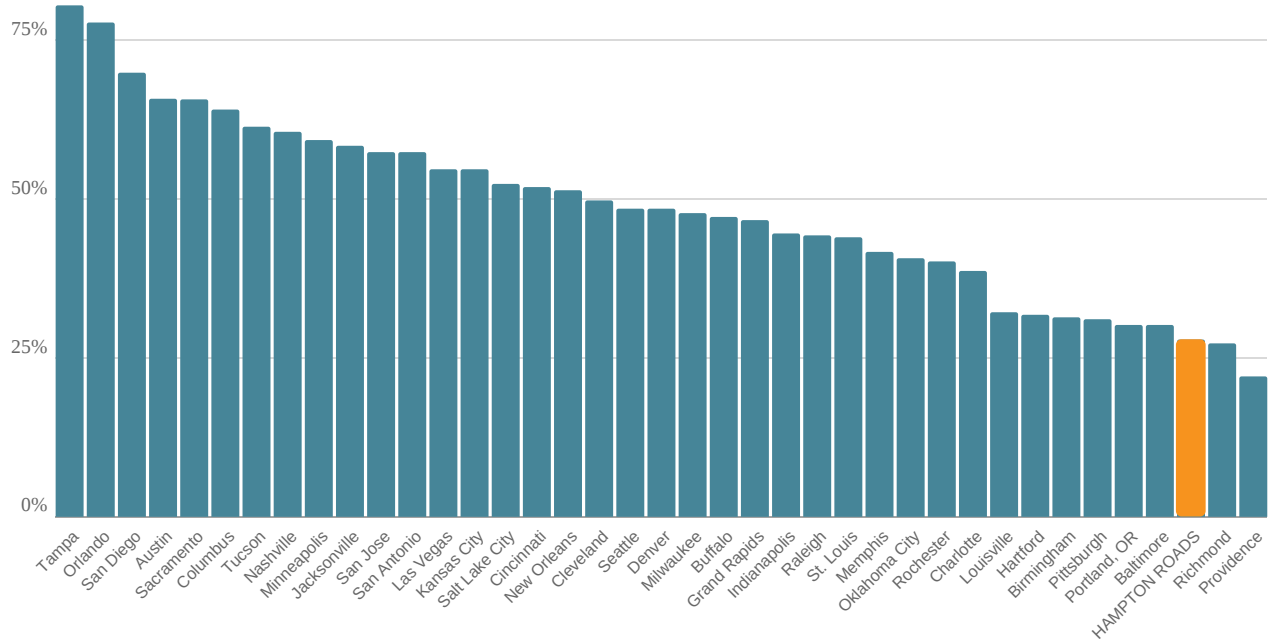
* Bridges are defined by the National Bridge Inventory as any structure that carries or spans vehicular traffic on a public roadway and has a length of more than 20 feet. Bridges less than or equal to 20 feet in length are not included in these statistics, nor are bridges on military bases and private property.

Figure 32: Structurally Deficient Bridges - Large Metropolitan Areas



Data Sources: FHWA, VDOT. FHWA data as of 2018, Hampton Roads (VDOT) data as of April 2019.

Figure 33: Bridges in Good Condition - Large Metropolitan Areas



Data Sources: FHWA, VDOT. FHWA data as of 2018, Hampton Roads (VDOT) data as of April 2019.

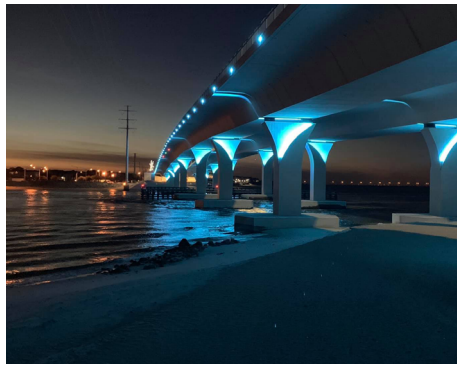
Several major bridge projects have been completed in recent years, with many others either underway or soon to begin construction. High profile examples include:

- **Gilmerton Bridge** – Construction on the new Gilmerton Bridge – which has more than three times the vertical clearance as the previous structure – was completed in 2015. The new 4-lane facility replaces the original drawbridge that was constructed in the 1930s.
- **South Norfolk Jordan Bridge** – The privately-owned South Norfolk Jordan Bridge, which crosses the Southern Branch of the Elizabeth River between Chesapeake and Portsmouth, opened to traffic in October 2012. The 169-foot-tall fixed-span structure replaced the original Jordan Bridge, which was closed in 2008 after falling into disrepair.
- **Dominion Boulevard Veterans Bridge** – The Dominion Boulevard Veterans Bridge is a fixed-span 4-lane limited access facility spanning the Southern Branch of the Elizabeth River in Chesapeake. The Veterans Bridge, which has 95 feet of vertical clearance, opened to traffic in 2016. The Veterans Bridge replaced the Steel Bridge, which was a two-lane drawbridge that was constructed in 1962.
- **Lesner Bridge** – Construction was completed in 2018 on a replacement for the Lesner Bridge, which carries Shore Drive across Lynnhaven Inlet in Virginia Beach. The new facility was built to accommodate the possibility of 6 lanes in the future, provide an increased vertical clearance from 35 feet to 45 feet, provide a wider distance between bridge piers, and include new multi-use paths in both directions for pedestrians and cyclists.
- **High-Rise Bridge** – Construction has begun on widening the I-64 corridor in Chesapeake, which will include the High-Rise Bridge. The project will include a new 100-foot high fixed span located just to the south of the existing facility, which will remain in use. The project is expected to be complete in 2021.
- **Hampton Roads Bridge-Tunnel** – After decades of looking at ways to increase roadway capacity across the Hampton Roads Harbor, widening of the Hampton Roads Bridge-Tunnel will begin in 2020. The project will include the addition of twin 2-lane bored tunnels to the west of the existing tunnels and the widening of the adjacent 4-lane segments of the I-64 corridor. The contract for the $3.8 billion project was awarded to Hampton Roads Connector Partners in early 2019, and the project is expected to be complete by November 2025.

Gilmerton Bridge

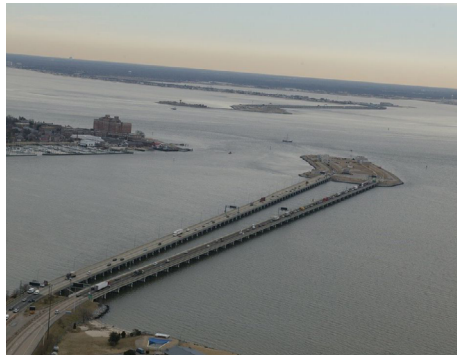
South Norfolk Jordan Bridge

Dominion Boulevard Veterans Bridge



Lesner Bridge

High-Rise Bridge



Hampton Roads Bridge-Tunnel

BRIDGE STRATEGIES

There are currently plans and funding in place to address many of the structurally deficient bridges throughout Hampton Roads. Of the 60 bridges that are classified as structurally deficient, 48 (80%) have funding for rehabilitation or replacement included in VDOT's Fiscal Year (FY) 2020-2025 Six-Year Improvement Program (SYIP).

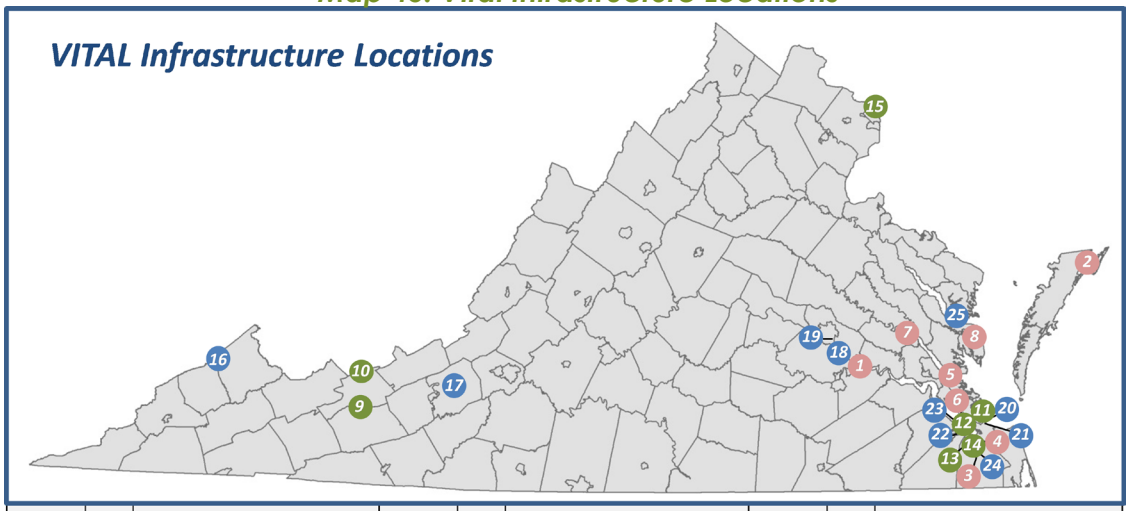
Many of these bridges are being funded through the State of Good Repair program that was created by House Bill (HB) 1887, which was described in the previous section. HB 1887 not only directed a larger percentage of funds to maintaining and replacing deficient bridges, but also created a priority ranking system for this funding.

However, VDOT predicts that even with the additional funding, these levels are not sufficient to maintain bridges in the current state in future years. VDOT predicts that the percentage of bridge deck area in good condition on the National Highway System (NHS) statewide will decrease from 34% in 2018 to 32% in 2028, and the percentage of bridge deck area in poor condition will increase each year starting in 2022.

Funding will particularly be an issue with large and unique structures both in the region and throughout the Commonwealth. VDOT has designated 25 structures throughout the state as "VITAL" (Very Large, Indispensable, Transportation Asset List) Infrastructure. VITAL Infrastructure consists of tunnels, movable bridges, and large and complex structures. Of the 25 VITAL structures, more than half (13) are in the Hampton Roads Metropolitan Planning Area (MPA).

VDOT estimates that over $3.6 billion (in 2018 dollars) will be necessary to maintain VITAL Infrastructure over the next 30 years. Of this amount, nearly $2.3 billion is needed for VITAL structures in Hampton Roads. These needs would overwhelm the funding available in the State of Good Repair program, and VDOT is currently working on potential investment strategies to fund the future needs of VITAL Infrastructure.

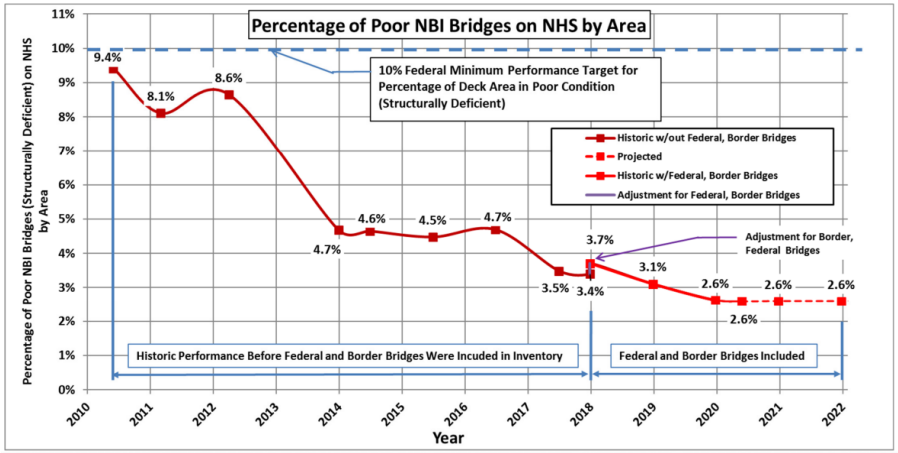
Map 45: Vital Infrastructure Locations



Type	No.	Structure
Movables	1	Benjamin Harrison
	2	Chincoteague
	3	High Rise
	4	Berkley
	5	Coleman
	6	James River Bridge
	7	Eltham
	8	Gwynn's Island
Tunnels	9	Big Walker Tunnel
	10	East River Tunnel
	11	Tunnels of Hampton Roads Bridge Tunnel
	12	Tunnel of Monitor Merrimac Memorial Bridge Tunnel
	13	Elizabeth River Midtown Tunnel
	14	Elizabeth River Downtown Tunnel
	15	Rosslyn Tunnel
Large and Complex	16	460 Connector
	17	Smart Road Bridge
	18	Varina-Enon
	19	895/Pocahontas Parkway
	20	HRBT Approaches
	21	Willoughby Bay
	22	MMMBT Approaches
	23	James River Bridge Approaches
	24	High Rise Bridge Approaches
	25	Norris Bridge

Source: VDOT

Figure 34: VDOT Past and Predicted Bridge Condition



Source: VDOT

On a regional level, while few bridges are in poor condition, very few are in good condition as well as shown previously. As the condition of the bridges in fair condition throughout Hampton Roads degrades in future years, additional funding will be necessary. HRTPO estimates that $4.5 billion would be necessary to fund the maintenance of bridges in Hampton Roads through 2045. Most of these funds – over $3.5 billion – will be needed in 2034 and later years. Of the $4.5 billion needed to maintain existing bridges in Hampton Roads through 2045, $3.4 billion are within the purview of the HRTPO Long-Range Transportation Plan. This $3.4 billion is 28% of the approximately $12 billion in funding for maintenance provided in the 2040 Hampton Roads LRTP.

HRTPO regularly prepares the *Hampton Roads Regional Bridge Study*, which looks at many aspects of the region's bridges. The most recent version of the Regional Bridge Study, which was released in May 2018, is available on HRTPO's website at http://hrtpo.org/page/technical-reports.

TUNNEL CHALLENGES

There are five underwater tunnels in Hampton Roads:

- Downtown Tunnel (I-264)
- Midtown Tunnel (US Route 58)
- Hampton Roads Bridge-Tunnel (I-64)
- Monitor-Merrimac Memorial Bridge-Tunnel (I-664)
- Chesapeake Bay Bridge-Tunnel (US Route 13).

In addition, a sixth tunnel carries I-564 underneath the runway at Naval Station Norfolk.

These facilities — which carry a combined average of 334,000 vehicles each weekday — are a critical component of the regional network. Their importance has been highlighted during events such as the Midtown Tunnel flooding during Hurricane Isabel, the Hampton Roads Bridge-Tunnel flooding due to a broken water main in 2009 (referred to as "Carmageddon"), and the impacts of multiple simultaneous Hampton Roads Harbor crossing closures such as the weekend of September 15, 2012.

Several tunnel expansion and rehabilitation projects have occurred in recent years. Along with constructing a new tube at the Midtown Tunnel, Elizabeth River Crossings (ERC) also rehabilitated the existing Midtown and Downtown Tunnels. Rehabilitation of these tunnels included fireproofing for structural protection, a new jet fan ventilation system, brighter and more efficient LED tunnel lighting, tile and concrete repair, and improved signage. In addition, construction will begin in 2020 on a new tube at the Hampton Roads Bridge-Tunnel, which will also include rehabilitating the existing tunnels.

All tunnels are inspected regularly by qualified inspectors. VDOT also performs a tunnel maintenance and operations program that includes maintaining and replacing safety and operations systems (such as fire suppressant, flood prevention, traffic control, and drainage systems), replacing tunnel roof panels, upgrading lighting, maintaining pavement, and improving structural components.

TUNNEL STRATEGIES

Funding will be needed to maintain the region's tunnels, both for ordinary maintenance and for occasional major projects. VDOT estimates that $623 million (in 2018 dollars) will be needed over the next 30 years for major maintenance projects at the Hampton Roads Bridge-Tunnel and Monitor-Merrimac Memorial Bridge-Tunnel. This only includes major maintenance for the tunnels themselves and does not include the approach bridges, which will need an additional $930 million (in 2018 dollars). Similar funding will also be necessary for the other three underwater crossings; however, those facilities are funded through tolls collected by ERC and the Chesapeake Bay Bridge and Tunnel District.

As was indicated previously in this section, VDOT is currently working on potential investment strategies to fund the future needs of VITAL Infrastructure, which includes most of the tunnels in the region.

SAFETY

Roadway crashes have a wide range of impacts, not only on the transportation system but also on families, friends, and society as a whole. Because of these impacts, roadway safety must be one of the highest priorities in the transportation planning process.

SAFETY CHALLENGES

There was a total of 26,916 crashes in Hampton Roads in 2018 according to data collected by the Virginia Department of Motor Vehicles. This is an average of 74 crashes every day throughout the year, or one crash in the region every 19 minutes. While this is much lower than the 32,000 crashes that occurred yearly in the middle of last decade, the number of crashes experienced in the region has increased most years this decade, and the number of crashes increased by 12% between 2009 and 2018.

The number of injuries resulting from traffic crashes has followed a similar trend to the number of crashes over the last decade. There were 16,448 injuries that resulted from traffic crashes in Hampton Roads in 2018. This is up 17% from the 14,004 injuries that occurred in 2009.

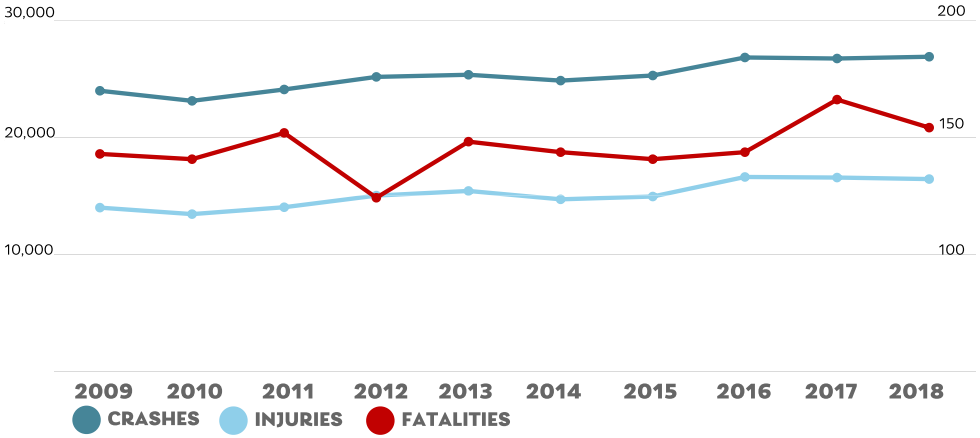
The number of fatalities in Hampton Roads has fluctuated over the last decade. There were 139 fatalities resulting from traffic crashes in Hampton Roads in 2018. Although this is a decrease from the 155 fatalities experienced in Hampton Roads in 2017, it is 12% higher than the number of fatalities in 2009.

STRATEGIES TO ADDRESS SAFETY

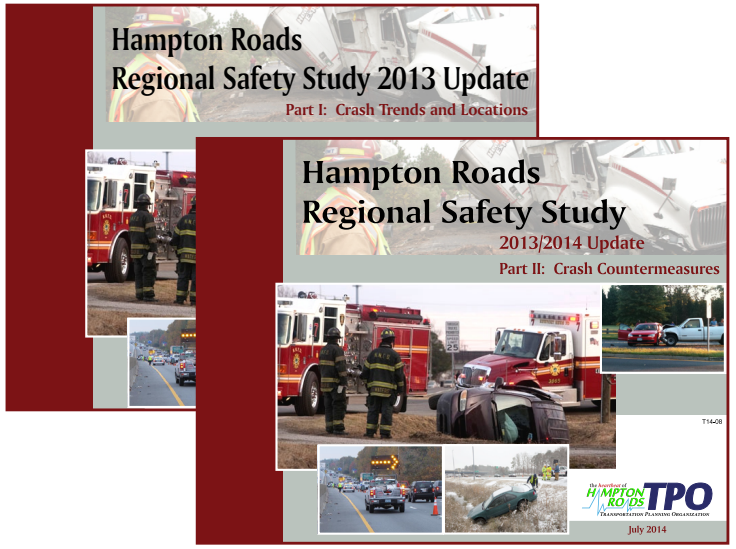
To help improve roadway safety, the HRTPO regularly prepares the Hampton Roads Regional Safety Study, with the most recent update released in 2013 and 2014. Part I of the study addresses previous HRTPO safety planning efforts, reports the recent trends in roadway safety in Hampton Roads, provides detailed characteristics of crashes in the region, and specifies the number and rate of crashes for each mile of freeway and approximately 600 of the busiest intersections throughout the region.

Part II of the Regional Safety Study examines ways to improve roadway safety. Sections include national, regional, and local efforts to improve roadway safety; general crash countermeasures; and an analysis of high crash locations including collision diagrams, site observations, possible causes, and prioritized recommendations.

Figure 35: Crashes, Injuries, and Fatalities in Hampton Roads, 2009-2018

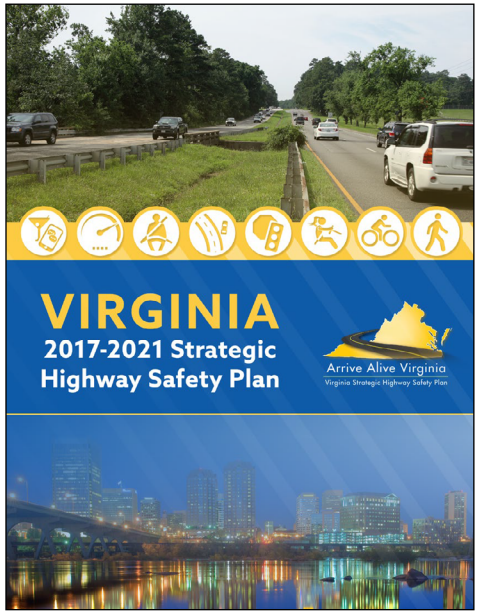


Data source: Virginia DMV



HRTPO staff will prepare an update to the Regional Safety Study in 2021.

There are several other regional and statewide roadway safety improvement strategies that have been implemented both in Hampton Roads and throughout the Commonwealth. Some of these strategies include:



Strategic Highway Safety Plan – Strategic Highway Safety Plans (SHSP) are statewide, coordinated plans that provide a comprehensive framework for improving roadway safety. This is done by addressing the four E's of transportation safety – Education, Enforcement, Engineering, and Emergency Response and Medical Services. Federal transportation legislation requires that each state must have and regularly update an SHSP.

The first Virginia SHSP was produced in 2006, and updates to the plan have been released in 2012 and 2017. The plans have been produced by VDOT as part of a collaborative effort. A wide variety of Federal, State, local, and private sector stakeholders were involved in the development of the plan, including the Virginia Department of Motor Vehicles, Department of Education, Department of Health, State Police and Association of Chiefs of Police, the Federal Highway Administration, and HRTPO staff. The SHSP update also involved significant outreach to gather input from stakeholders across the state, including a number of regional "road shows."

The purpose of Virginia's SHSP is to reduce fatalities and serious injuries on all public roads by identifying Virginia's key safety needs and guiding investment decisions. The plan adopted a vision of "Toward Zero Deaths", which is a nationwide policy that all roadway users should arrive safely at their destinations and even one death is unacceptable. The plan also established a statewide goal to reduce deaths and severe injuries by half by the year 2030, and statewide targets of reducing deaths by 2% per year and severe injuries by 5% each year.

Based on an analysis of statewide crash data, the SHSP is focused on a number of critical safety areas with the greatest promise to reduce crashes and serious injuries These emphasis areas are: 1) impaired driving, 2) speeding, 3) occupant protection, 4) roadway departure, 5) intersections, 6) young drivers, 7) bicyclists, and 8) pedestrians. Additional emphasis is given in the Strategic Highway Safety Plan to connected and autonomous vehicles, incident response and emergency medical services, and the collection, management, and analysis of crash data.

The SHSP contains a number of strategies and action steps to address each of these emphasis areas. The progress made towards reaching the goals of each emphasis area is also monitored by the SHSP Steering Committee.

The 2017-2021 Virginia Strategic Highway Safety Plan is available at http://www.virginiadot.org/info/hwysafetyplan.asp.

Highway Safety Improvement Program – The primary mechanism for funding roadway safety improvements is the Highway Safety Improvement Program (HSIP). Federal legislation established the HSIP as a core Federal aid program in 2005 in order to achieve a significant reduction in traffic fatalities and serious injuries on public roadways. The HSIP requires a data-driven, strategic approach to improving highway safety that focuses on performance.

Funding for HSIP was greatly increased in 2012 under the Moving Ahead for Progress in the 21st Century Act (MAP-21) transportation authorization program. Over $2.4 billion was allocated annually to HSIP under MAP-21. Funding levels decreased slightly under the current transportation authorization program, The Fixing America's Surface Transportation (FAST) Act. About $2.2 billion was allocated to HSIP in FY 2016, increasing to $2.4 billion in FY 2020.

Virginia's HSIP funding has also increased in recent years. Virginia received an average apportionment of $38.3 million in Federal Fiscal Years (FFY) 2006-2009 under SAFETEA-LU, and $42.8 million in FFY 2010-2012 under SAFETEA-LU extensions. Under MAP-21, Virginia was allocated $60 - $65 million in HSIP funds in each FFY from 2013 to 2015. Under the FAST Act, Virginia was allocated $59.6 million in HSIP funds in FFY 2016, which has increased to $64.1 million in FFY 2020.

To be eligible for HSIP funding, a project must be a strategy, activity, or project on a public road that corrects a hazardous road location or feature, or addresses a highway safety problem. Projects must also be consistent with the statewide *Strategic Highway Safety Plan* to be eligible for HSIP funding.

More information on the Highway Safety Improvement Program is available at http://safety.fhwa.dot.gov/hsip. VDOT's HSIP page (http://www.virginiadot.org/business/ted_app_pro.asp) also provides information on the program, including how VDOT selects projects for HSIP funding and an application form for proposed HSIP projects.

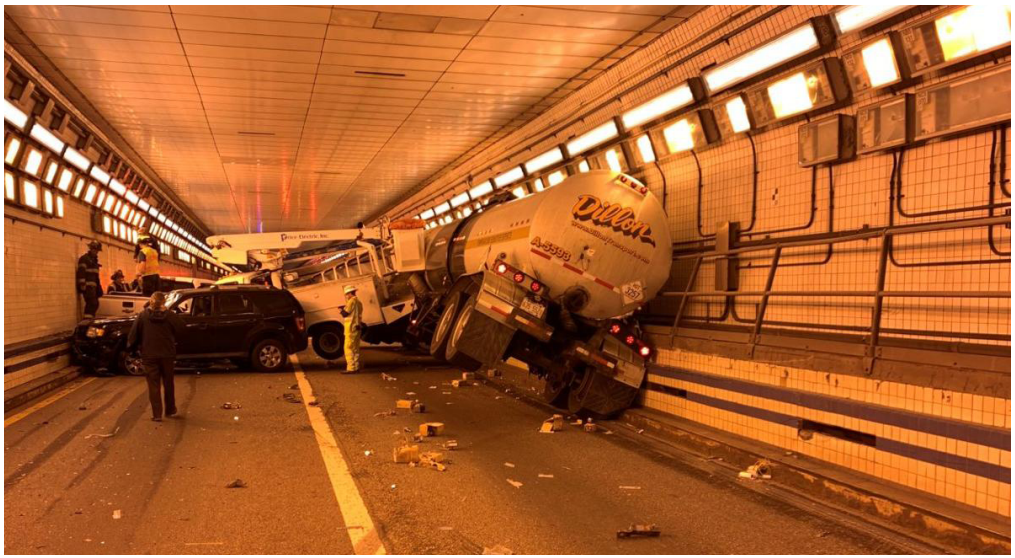
Road Safety Audits – According to FHWA, a Road Safety Audit (RSA) is a formal and independent safety performance review of an existing or future road or intersection by an experienced team of safety specialists and stakeholders addressing the safety of all road users. The overall objective of an RSA is to analyze site crash trends and to develop and recommend potential safety countermeasures to mitigate them. In many places, Road Safety Audits are referred to as Road Safety Assessments.

VDOT uses the RSA process to continue to reduce the number of severe and fatal crashes by proactively identifying existing and potential safety issues and providing recommended improvements. VDOT promotes RSAs as the foundation of transportation safety planning and recommends that RSAs be included throughout the project development and delivery process. To assist with this process, VDOT has prepared a Road Safety Audit manual that provides users with information about the formal RSA process, roles and responsibilities of RSA team participants, and information pertaining to when RSAs must be performed. Useful resources, sample agendas, field review prompt lists, and a report template are also provided.

Safety Programs and Educational Efforts – There are a number of regional, statewide, and national organizations and programs that have been created to improve various aspects of roadway safety. Some of these agencies address safety in a specific geographical region, while others were created to address specific issues such as bike safety or reducing alcohol-related crashes. Examples of some of these efforts include Drive Safe Hampton Roads, Drive Smart Virginia, and Virginia's Pedestrian Safety Action Plan.

Roadway safety is also included in other HRTPO transportation planning tasks. HRTPO staff uses crash data in the Project Prioritization Tool to prioritize projects for inclusion in the Hampton Roads Long-Range Transportation Plan and Transportation Improvement Program. Safety is also used as a measure for determining Critical Congested Corridors in the Congestion Management Process.

More information on HRTPO's roadway safety planning efforts and the Hampton Roads Regional Safety Study is available at http://hrtpo.org/page/roadway-safety.



Crash in the Hampton Roads Bridge-Tunnel

INFRASTRUCTURE SECURITY

Hampton Roads is vulnerable to potentially catastrophic events including hurricanes, flooding, and even terrorism. If any of these events were to occur, a reliable transportation system will be crucial in evacuation scenarios and disaster response.

INFRASTRUCTURE SECURITY CHALLENGES

Due to the physical constraints of the region, transportation options are limited. Construction and maintenance costs associated with water crossings are extremely expensive, which limits the number of crossings that can be constructed. As a consequence, if a facility shuts down or experiences reduced service, remaining facilities, which are already working at or near maximum capacity, will be further compromised. This would complicate any needed evacuation plans or disaster response. In addition to these immediate transportation impacts, a shutdown of our system can also cause cascading disruptions to other sectors such as: the economy (including loss of wages), goods movement (including the Port of Virginia), and emergency response.

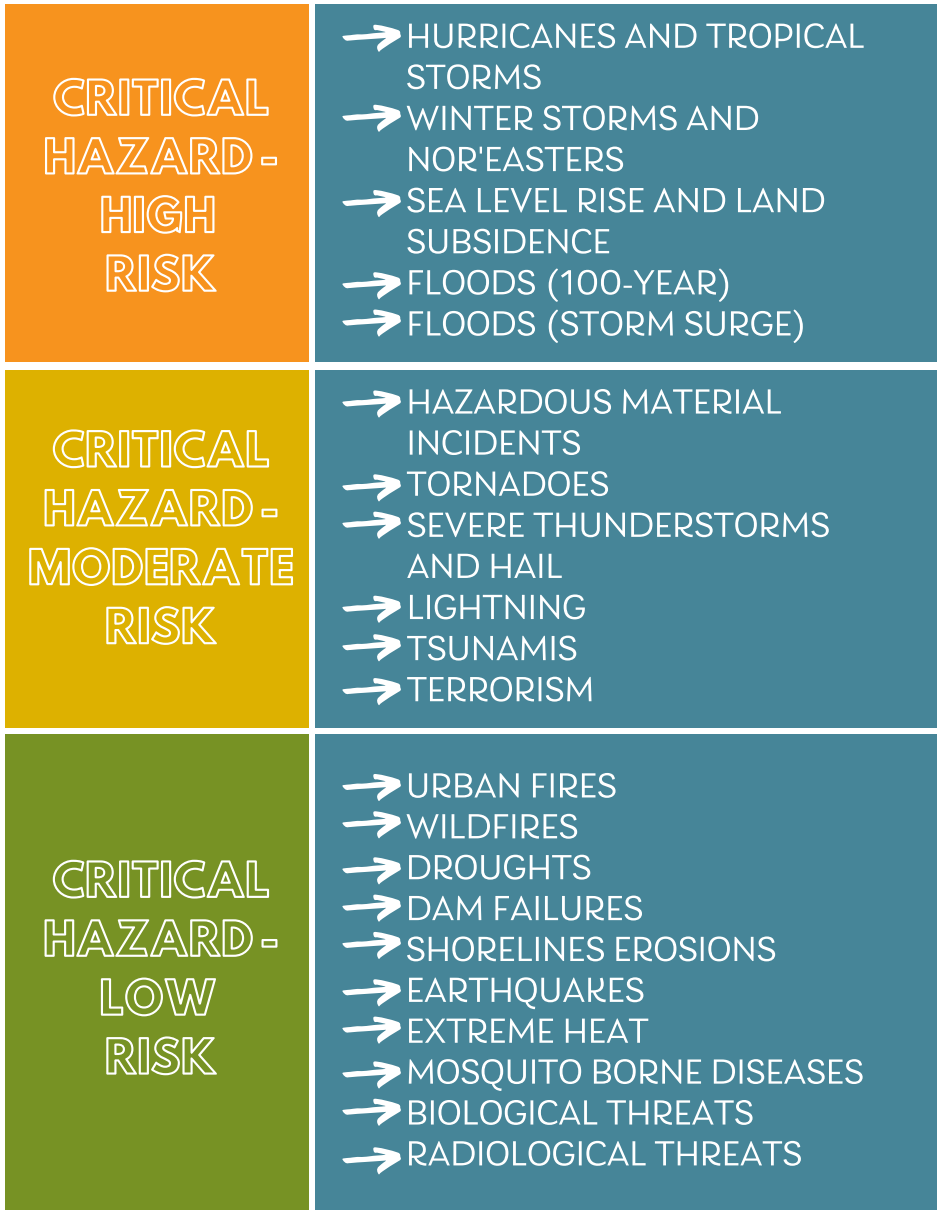
To further highlight the importance of a reliable transportation system, Hampton Roads contains one of the highest concentrations of military and civil defense populations in the world. A compromised transportation system can negatively impact the military's ability to carry out its mission or respond to a national security threat.

Figure 36 highlights the various hazards to Hampton Roads, of which several can impact transportation. Within the listing, hazards are categorized by risk (likelihood of the hazard occurring in the region).

INFRASTRUCTURE SECURITY STRATEGIES

Protecting and ensuring the resiliency of the Critical Infrastructure and Key Resources (CIKR) within Hampton Roads is vital to the health, safety, economic vitality, and security of the region. Compromises to the regional transportation system could be disruptive to the movement of people and goods. Various federal, state, and regional plans and efforts have been developed to protect infrastructure and the population.

Figure 36: Various Hazards Categorized by Risk



Source: HRTPO

Infrastructure Protection Plans

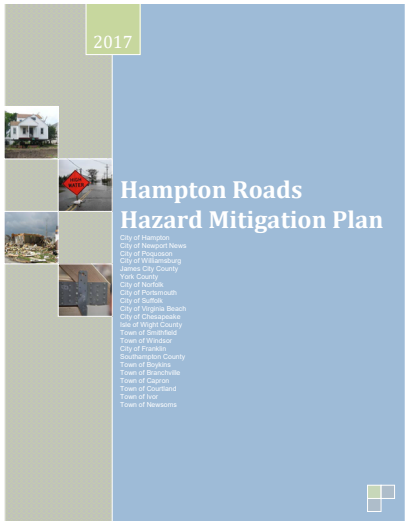
The National Infrastructure Protection Plan (NIPP), published in 2009 and updated in 2013, outlines how government and private sector participants in the critical infrastructure community work together to manage risks and achieve security and resilience outcomes. Transportation is among the 18 critical sectors identified within the NIPP. The purpose of this effort is to identify critical infrastructure and develop strategies to mitigate risk and secure critical infrastructure and key resources in a collaborative and proactive manner.

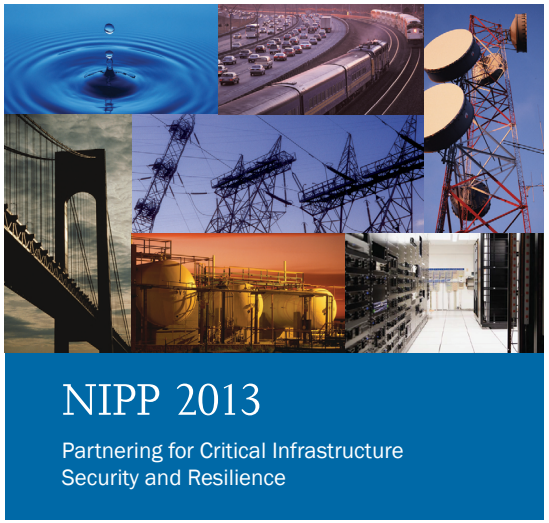
The Virginia Critical Infrastructure Protection & Resiliency Strategic Plan has been developed to mirror the NIPP and to define the Commonwealth's strategy, as well as to direct implementation of supporting plans.

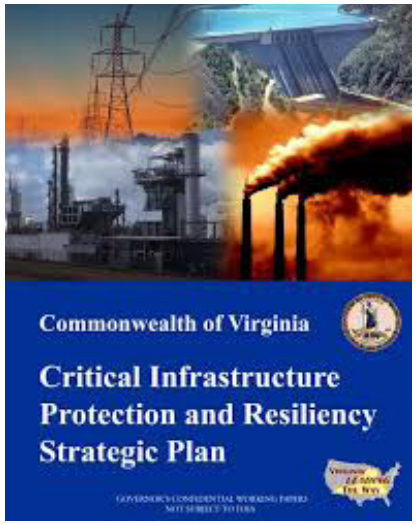
Currently, local, state, and Federal stakeholders are working together with the private sector to address CIKR, including the transportation sector, from a whole of community perspective.

Regional Hazard Mitigation Plan

The 2017 Hampton Roads Hazard Mitigation Plan is being updated for 2022. The region is vulnerable to a wide range of hazards that threaten the safety of residents. These hazards have the potential to damage or destroy both public and private property and disrupt the local economy and overall quality of life. While the threat from hazards may never be fully eliminated, the Hampton Roads Hazard Mitigation Plan recommends specific actions designed to protect residents, business owners, and the built environment.







SECURITY OF VARIOUS TRANSPORTATION MODES

PUBLIC TRANSPORTATION SECURITY CHALLENGES AND STRATEGIES

Public transportation systems move thousands of users daily. In Hampton Roads, an average of approximately 1.3 million passenger trips are made on the Hampton Roads Transit (HRT), Williamsburg Area Transit Authority (WATA), and Suffolk transit systems monthly. Transit services are also provided to numerous military and federal facilities across the region. Interruptions to regional transit service could have serious repercussions to the mobility and livelihood of its users as well as to the security of the region.

To assist in mitigating security risks to the public transportation network, the Federal Transit Administration (FTA) provides direct assistance to transit agencies in the form of technical committee teams and regional forums for emergency responders; FTA also provides grants for training and research projects.[2] Additionally, the FTA has developed a list of security program action items that transit agencies should incorporate into their System Security Program Plans. Because of the openness of transit facilities, timely threat and intelligence information is critical in order for transit agencies to strategically allocate resources.[3]

Hampton Roads Transit

Hampton Roads Transit (HRT) develops a System Security and Emergency Preparedness Plan (SSEPP) that is reviewed and approved by the Virginia Department of Rail and Public Transportation (DRPT) as well as the FTA. The SSEPP establishes methodologies for threat and vulnerability assessments for the light rail system. HRT also has a security plan for buses and ferries, which is updated annually. The plan delineates security practices for HRT's security contractors, off-duty police officers working for HRT, and all pertinent safety and security employees.

Williamsburg Area Transit Authority

Williamsburg Area Transit Authority (WATA) has updated and completed its Emergency Response Plan and conducted an All Hazards Risk and Resiliency Assessment for the Authority.

WATA's safety and security procedures are outlined in the Driver's Handbook and include a protocol for several different types of emergencies and potentially hazardous scenarios.

Some of WATA's transit security programs components include:

- Two-way radios are used on vehicles so that drivers can communicate with dispatch in event of an emergency.
- Panic buttons are provided on vehicles for the drivers.
- Surveillance cameras are put on-board vehicles to record incidents.
- Clever Devices ITS System is used on-board vehicles for various applications, including a geographic tracking feature that can show dispatch the real-time location of vehicles.
- The Operations and Maintenance Facility parking lot is fenced in and gated with surveillance cameras.

WATA is also included in the James City County Community Service Emergency Plan which defines roles and responsibilities for transit personnel. Additionally, WATA personnel have participated in the following safety and security training over the past three years:

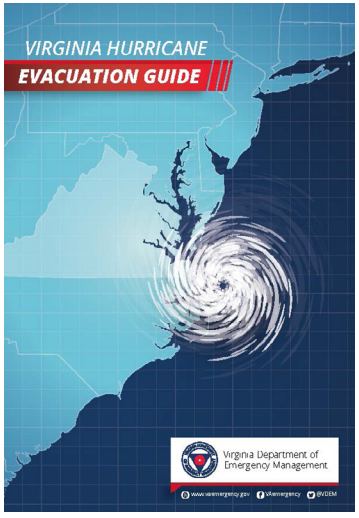
- System Security Awareness for Transit Employees
- National Incident Management System
- Virginia Operations Plan Exercise
- Pandemic Influenza-Tabletop
- Evacuation Planning & Disaster Recovery Regional Emergency Management Technical Advisory Committee
- Connecting Communities Public Transportation Emergency Preparedness Workshop

WATA also has a contingency fleet consisting of two heavy-duty (body-on-chassis) vehicles that are part of the regional emergency plan since the service area is within the hurricane corridor of Hampton Roads and is also within a ten mile radius of the Surry nuclear power plant.

1 Based on Ridership data from American Public Transportation Association, 2018.
2 Source: U.S. DOT, FTA
3 Source: U.S. DOT, FTA

RAIL SECURITY

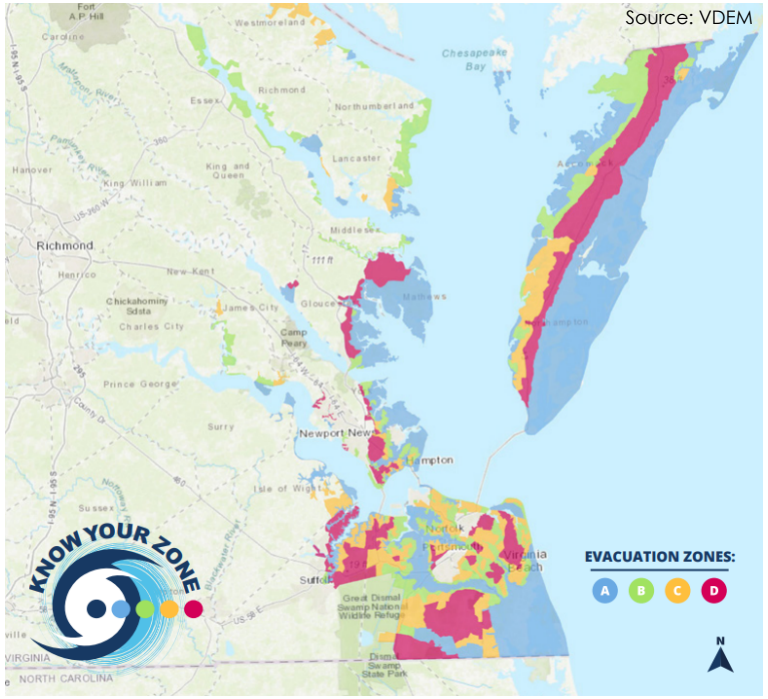
The security of the rail lines in Hampton Roads is also vital for the safety of people and the mobility of goods into and out of the region. Regional rail companies, such as Norfolk Southern and CSX, have forged rail security partnerships with federal, state, and local law enforcement.[4] These rail security partnerships share highly specialized and secure train and rail car monitoring, coordination and training of regional law enforcement, security upgrades to rail facilities, and advocating to policymakers on various issues that can impact rail security.



EVACUATION

Hampton Roads is vulnerable to potentially catastrophic events including hurricanes, flooding, and even terrorism. If any of these events were to occur, a reliable transportation system will be crucial in evacuation scenarios and disaster response. With the Hampton Roads transportation system being limited by the physical constraints of the region, preparing effective plans for evacuation scenarios is especially critical.

Virginia has developed a Hurricane Evacuation Guide for its citizens.



Map 46: Evacuation Zones

Considering the regional topography, population density, and coastal vulnerabilities to major hurricanes, Hampton Roads may require evacuation of its residents in the event of a severe hurricane due to storm surge and other hurricane related impacts. The complexity and vulnerability of the bridges and tunnels in the region could hamper or even prevent evacuation efforts if not coordinated properly.

According to the Hurricane Evacuation Guide, tiered evacuation zones were developed in close coordination with local emergency managers throughout Hampton Roads, the Northern Neck, the Middle Peninsula and the Eastern Shore based on the most up-to-date engineering data for the region. Zones are designated A through D. They provide residents with clarity on whether they should evacuate in an emergency or shelter at home, based on their physical street address and the nature of the emergency event. When a serious storm is expected to threaten or impact Virginia's coastal regions, state and local emergency agencies will work with local news media to

4 Source: CSX Incorporated

broadcast and publish evacuation directives to the public. It is up to the local residents to "know your zone" beforehand.

In addition to the state evacuation guide for Hampton Roads, the region must also collaborate with eastern North Carolina to allow for the coordinated, efficient, and expeditious evacuation of tourists and residents from the Outer Banks area. The North Carolina/Virginia Border Traffic Control Plan is a bi-state plan that manages evacuation traffic from the Outer Banks into Virginia without compromising the evacuation traffic and transportation system within Hampton Roads. This plan involves directing traffic onto US 158 in Barco, NC, diverting evacuation traffic away from the Chesapeake Expressway and the Hampton Roads region.

The Virginia Department of Emergency Management is also working on a list of short and long-term recommendations as detailed in a 2014 Report to the Governor titled In-season Review of Hurricane Preparedness for Hampton Roads. Among its recommendations, the report calls for improvements of evacuation routes, the use of evacuation modeling technology, and the utilization of evacuation zones.

Continued coordinated planning between local and state governments remains necessary in order to properly prepare for the potential threat of a catastrophic hurricane.

Source: VDEM

Hurricane Irene Evacuation, Outer Banks

5

CHAPTER 5: THE ENVIRONMENT

Hampton Roads is home to many natural resources, including woodlands, wetlands, rivers, and shorelines. These resources provide both economic and environmental benefits as tourist attractions, recreational areas for residents, and habitat for wildlife and marine life. Protecting and preserving these resources while balancing them with growth is a key strategy for promoting sustainable regional growth and development.

Challenges that Hampton Roads will face in protecting these resources include maintaining water and air quality, protecting environmentally sensitive areas, and adjusting to the impacts of climate change on the region (namely sea level rise and increased vulnerability to flooding). These issues will place stress on the planning, construction, maintenance, and operation of transportation infrastructure and services in the region.

To minimize impacts to natural resources in Hampton Roads, it is essential for the region to have effective mitigation strategies in place. Through collaboration with local, regional, state, and federal partners, Hampton Roads can outline policies and allocate resources to help protect the environment and improve the quality of life in Hampton Roads.

SUSTAINABILITY AND RESILIENCY (CLIMATE CHANGE AND SEA LEVEL RISE)

Sustainability is the ability to be maintained at a certain rate or level and often includes the avoidance of the depletion of natural resources. Because transportation infrastructure is such a significant part of the landscape, building and maintaining a sustainable transportation system – one that has a low impact on the environment and makes use of renewable, cleaner energy – is important to quality of life. Furthermore, transportation infrastructure investments have long-lasting implications not only on the transportation system but also on the larger environmental, economic, and social systems with which transportation interacts. Encouraging planners and engineers to think "longer-term" beyond what is required is an important part of building and maintaining a sustainable and resilient transportation system[1]

CLIMATE CHANGE CHALLENGES

Climate change presents a long-term challenge with the potential to negatively affect the region's infrastructure, economy, population, and environment. The Fourth National Climate Assessment, released in 2018, documents how the climate is already changing and is projected to change even further, with summaries for impacts to specific sectors, including the environment, communities, and transportation.

SEA LEVEL RISE CHALLENGES

Water is rising and land is sinking—this alarming combination is happening along many coastal regions, including Hampton Roads. The "relative" sea level rise for a given area is the change in sea level relative to the elevation of the land in that same area. This change is affected by three factors:

- Global Sea Level Rise (change in ocean volume)
- Land Subsidence
- Ocean Circulation

1 USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

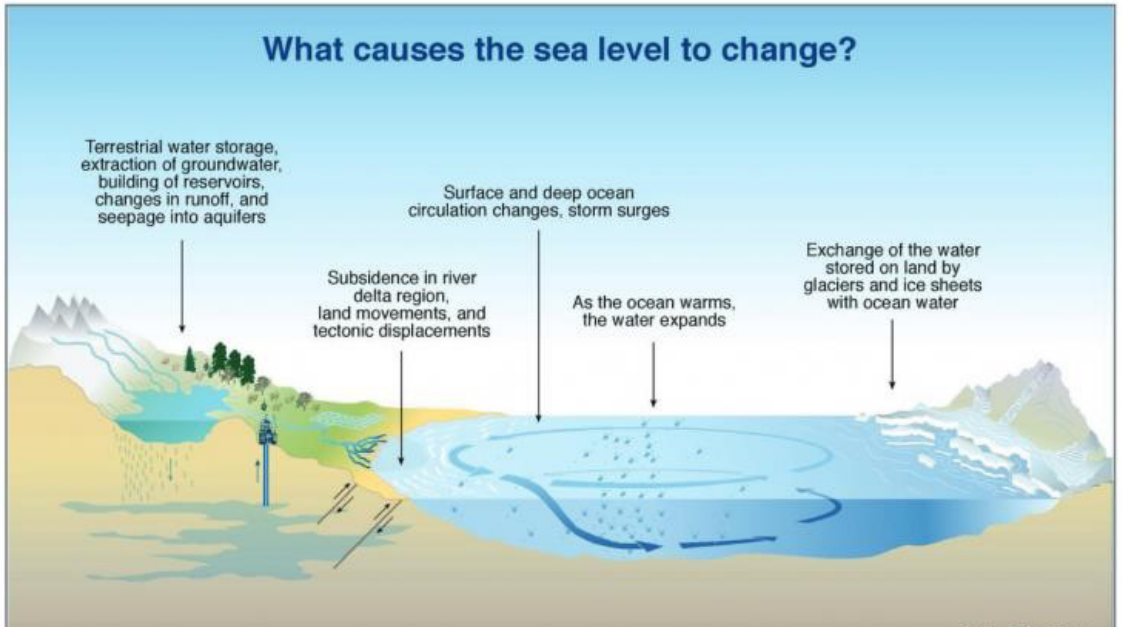


Figure 37: Relative Sea Level Rise

Global Sea Level Rise

Global sea level rises due to changes in the density and quantity of water in the world's oceans.[2] The two primary processes that have increased ocean water volume are 1) rising ocean temperatures – which cause the water to expand (thermal expansion) – and 2) melting glaciers, ice caps, and ice sheets. These two processes are estimated to have added over six inches to sea levels in the past century. These processes have increased in recent years and are now estimated to be adding water volume at double the prior rate.[3]

Land Subsidence

Land subsidence is the sinking of land. Subsidence generally occurs from sediment compaction or extraction of subsurface liquids like water or oil. One of the ongoing causes of land subsidence in the mid-Atlantic coastal region is the result of retreating ice sheets from the last Ice Age. As the ice sheets melted and retreated north, pressure from the weight of the ice was released and the earth's crust is still slowly readjusting. In coastal Virginia, groundwater withdrawals, largely for paper mills, are an additional contributing factor.[4] The region lies above a single aquifer system; removing groundwater results in sediment compaction primarily near large groundwater withdrawals but may cause land subsidence region wide. Additional localized subsidence occurs in areas where streams and creeks have been filled in to provide developable land. Historically, land subsidence has accounted for more than one-half of the relative sea level rise in the Hampton Roads region.[5]

Ocean Circulation

The decreasing rate of movement by the ocean currents that circulate the globe has contributed to the rapid rise in local sea levels discussed below. In the Mid-Atlantic, this appears to be due to a slowing of the Gulf Stream

2 Climate Change in Hampton Roads – Impacts and Stakeholder Involvement, Hampton Roads Planning District Commission (HRPDC), February 2010, p. 5.
3 Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012), Virginia Institute of Marine Science, January 2013, p. 110.
4 Ibid, p. 110-111.
5 Land Subsidence and Relative Sea-Level Rise in the Southern Chesapeake Bay Region, U.S. Geolocial Survey, 2013, p. 18.
6 Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012), Virginia Institute of Marine Science, January 2013, p. 111.

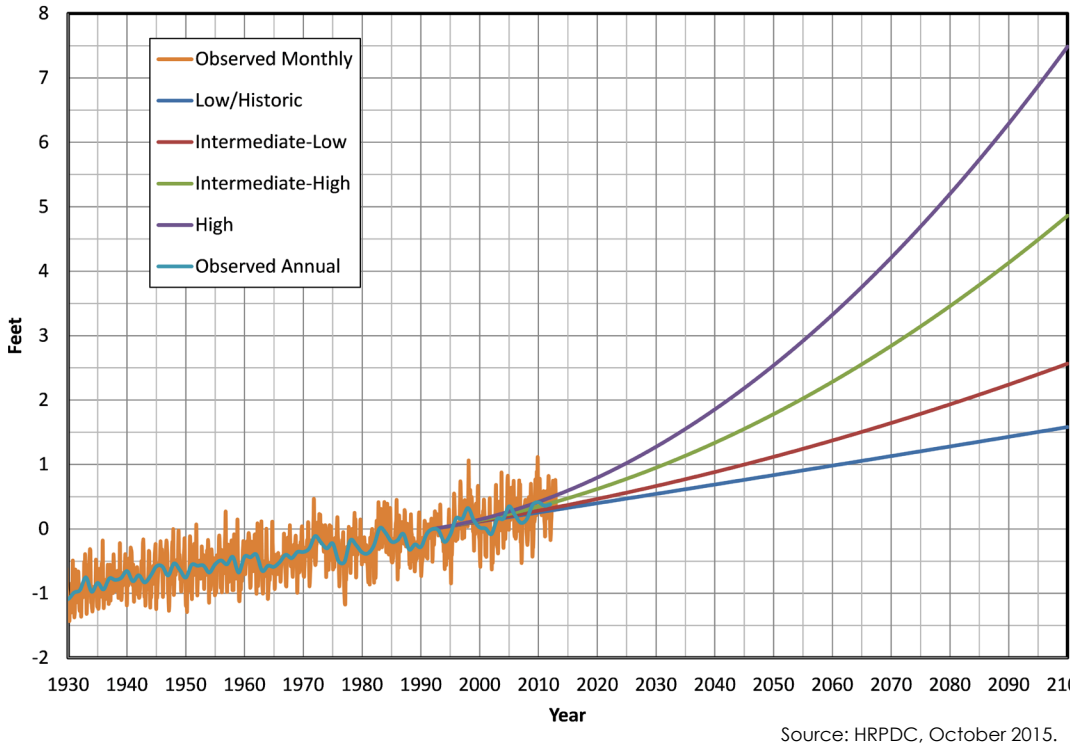
as the polar region continues to warm. Melting freshwater ice reduces the salinity of seawater near the poles, which reduces its density and the speed at which it sinks and circulates. Slower moving water means less pressure is present to move water away from the coast, resulting in higher water levels.[6]

Trends in Relative Sea Level Rise for Hampton Roads

Hampton Roads has experienced a total of 1.29 feet of relative sea level rise since 1927, based on the Sewell's Point tide gauge located on Naval Station Norfolk.[7] According to VIMS, recent analyses and indicators have detected acceleration in the rate of relative sea level rise from the mid-Atlantic to New England.[8] Existing research of global atmospheric processes indicated that temperatures will continue to rise at least until the end of the century. There is significant uncertainty, however, regarding how high and how quickly these temperatures will rise. The rate of land subsidence in Hampton Roads is expected to remain relatively stable.

Hampton Roads Planning District Commission (HRPDC) staff projected relative sea level rise based on a combination of global sea level rise scenarios in the 2014 U.S. National Climate Assessment[9] and local land subsidence models. Based on the four scenarios in the National Climate Assessment (low/historic, intermediate-low, intermediate-high, and high), HRPDC staff projected relative sea level rise in the range of 1.6 to 7.5 feet between 1992 and the year 2100 at Sewells Point. Current projections for sea level rise are calculated using a base year of 1992, which is also the midpoint of the most recent National Tidal Datum Epoch (NTDE), which spans 1983 to 2001. Tidal datums such as mean sea level are calculated for each NTDE, which in this case allows for relatively seamless comparisons between established, known local datums and global sea level rise projections. As shown on the graph above, these projections vary significantly due to the uncertainty of future global sea level rise estimates.

Figure 38: Observed & Projected Relative Sea Level Rise in Hampton Roads at Sewells Point Tide Gauge, VA (1930 - 2100)



Source: HRPDC, October 2015.

According to HRPDC projections (see graph above), a 2.0-foot rise in relative sea level (from a base year of 1992) is estimated to occur sometime between 2043 (high) and 2083 (intermediate-low). Concerning the HRTPO 2045 Long-Range Transportation Plan (LRTP), these two curves show a relative sea level rise of 1.0 to 2.2 feet (between base year 1992 and 2045). Given that the base year is 1992, the approximate amount of rise expected between today (2016) and 2045 would be 1.5 feet, since sea levels have risen about 0.5 feet since 1992.

6 Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012), Virginia Institute of Marine Science, January 2013, p. 111.
7 National Oceanic and Atmospheric Administration (NOAA) from Climate Change in Hampton Roads – Impacts and Stakeholder Involvement, Hampton Roads Planning District Commission (HRPDC), February 2010, p. 6-7.
8 Ezer, T., L. P. Atkinson, W. B. Corlett and J. L. Blanco. Gulf Stream's induced sea level rise and variability along the U.S. mid-Atlantic coast. J. Geophys. Res. Oceans, 118, 685-697.
9 Global Sea Level Rise Scenarios for the United States National Climate Assessment, National Oceanic and Atmospheric Administration, NOAA Technical Report OAR CPO-1, December 6, 2012.

Storm Surge

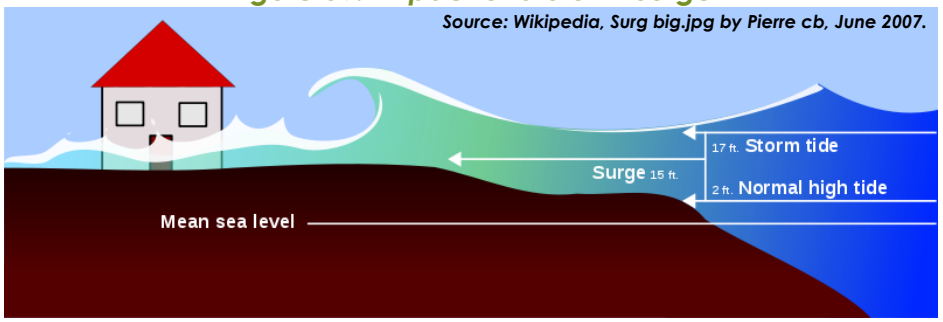
According to the National Oceanic and Atmospheric Administration (NOAA), storm surge is water that is pushed toward the shore by the force of the winds swirling around the storm. In addition, low atmospheric pressure associated with storms raises sea levels. Severe storms, such as a hurricane, tropical storm, or nor'easter, cause storm surge. This surge combines with the normal tides to create the storm tide, which can increase the mean water level 15 feet or more.

In addition, wind waves are superimposed on the storm tide. The resulting rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with high tide. Storm surges cause devastating property losses, such as damaged roads and bridges, destroyed homes and businesses, and damaged coastal communities. Because many properties in Hampton Roads lie less than 10 feet above mean sea level, the danger from storm tides is great.

In Hampton Roads, storm surges of 4.2 feet were recorded at the Sewells Point tide gauge during Hurricane Irene in 2011 and 4.4 feet during Hurricane Isabel in 2003.

1933 Flooding on Granby Street in Norfolk

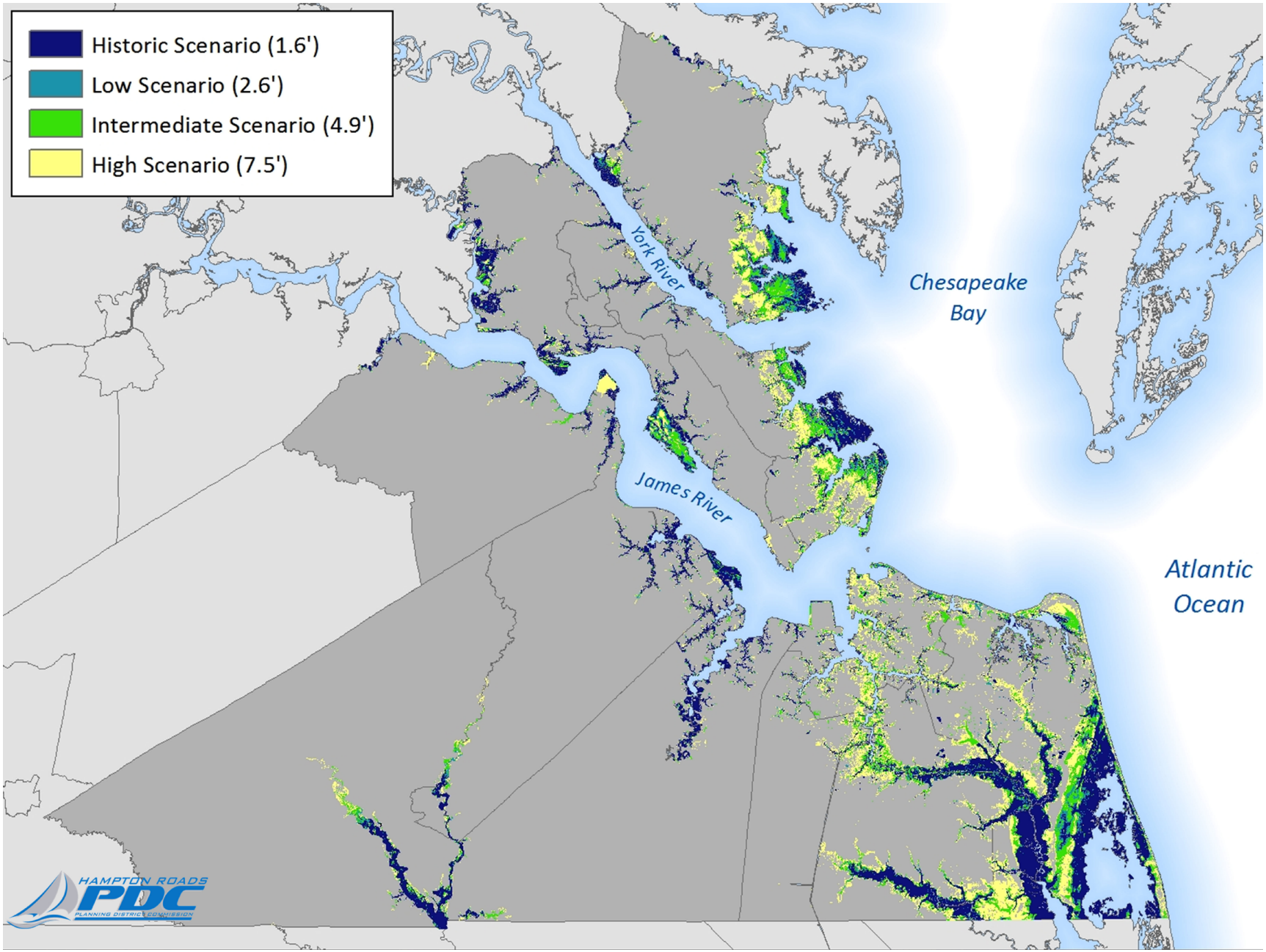
Figure 39: Impact of a Storm Surge



Flooding on Virginia Beach Boulevard, August 2012

10 Climate Change Impacts in the U.S.: The Third National Climate Assessment, Chapter 5 Transportation, 2014.
11 Virginia Conservation Network website, "Confronting Climate Change" webpage, www.vcnva.org, April 2013.

Map 47: Vulnerability to Sea Level Rise in Hampton Roads



Source: HRPDC

IMPACTS ON TRANSPORTATION SYSTEM AND ROADWAY INFRASTRUCTURE

The impacts from sea level rise and storm surge, extreme weather events, precipitation changes, higher temperatures and heat waves, Arctic warming, and other climatic changes are affecting the reliability and capacity of the U.S. transportation system.[10] Sea level rise, coupled with storm surge, will continue to increase the risk of major coastal impacts on transportation infrastructure, including both temporary and permanent flooding of airports, ports and harbors, rail lines, transit facilities, and roadways and bridges.

Extreme flooding events currently disrupt transportation networks and will likely become more prevalent as sea levels are expected to rise at an accelerated pace for many coastal regions, such as Hampton Roads. Hampton Roads—second only to New Orleans in terms of vulnerability to sea level rise in the United States—is seeing more frequent storm surges and higher tides than before.[11]

The state of Virginia has recently placed emphasis on sea level rise and flooding impacts, especially in Hampton Roads. On March 16, 2015, Governor McAuliffe signed Virginia legislation (SB 1443), amending the Code of Virginia by adding section 15.2-2223.3 for comprehensive plans to incorporate strategies to combat project sea-level rise and recurrent flooding:

> "Beginning July 1, 2015, any locality included in the Hampton Roads Planning District Commission shall incorporate into the next scheduled and all subsequent reviews of its comprehensive plan strategies to combat projected relative sea-level rise and recurrent flooding. Such review shall be coordinated with the other localities in the Hampton Roads Planning District Commission."

Sea level rise will cause significant impacts to coastal regions. Some areas are already experiencing permanent inundation, while other areas are seeing more frequent flooding. As sea levels continue to rise, some areas that have not seen flooding will start to experience it, which will have major infrastructure impacts.

Most transportation infrastructure, particularly roadways and bridges, were designed to last 50 years or longer; however, many were constructed without today's knowledge of climate change and the accelerated projections in sea level rise. Several roadways were built along low-lying areas and are now vulnerable to sea level rise and recurrent flooding. Replacing, retrofitting, and/or elevating roadways, bridges, and other critical transportation facilities is expensive and is not an option for many regions due to funding limitations. Therefore, it is important to understand how future climate changes might affect these investments in the coming decades.

Repetitive flooding at critical transportation facilities can severely impact travel and hurt regional and local economies. When streets are impassable during and after flooding events, it often results in damages to personal property and missed work time, which has a crippling effect on communities.

According to a Virginia Institute of Marine Science (VIMS) study, there are three primary threats to roadway networks because of relative sea level rise/storm surge[12]

- Flooding of evacuation routes
- Increased hydraulic pressure on tunnels
- Alteration to drainage capacity

Flooding of Evacuation Routes

As sea levels continue to rise, during storm surge events critical evacuation routes may become unusable. Although most evacuation occurs before storm surge, evacuation decisions will need to be made sooner to preserve the safety of citizens within the community.

Increased Hydraulic Pressure on Tunnels

Bridges and tunnels are widely used throughout Hampton Roads to traverse many of the waterways. These facilities are static structures that cannot be easily retrofitted to compensate for rising sea levels. Tunnel entrances that cannot be raised pose potential flooding risks for the tunnel, and a higher water level resulting from surge increases the hydraulic pressures on the tunnel structure.[13]

12 Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012), Virginia Institute of Marine Science, 2013, p. 93.
13 Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012), Virginia Institute of Marine Science, 2013, p. 93.

Alteration to Drainage Capacity

Roadway drainage systems rely on the hydraulic gradient to drain water properly. In Hampton Roads, many roadways were constructed in low elevation areas, which makes drainage a challenge. As sea levels rise, hydraulic gradient is reduced, which slows the flow of water and can cause stormwater to back up or pond on the roadway and create a flooding condition.

Other Impacts

Relative sea level rise exacerbates coastal erosion, which may erode roadways in Hampton Roads that are adjacent to waterways. On the other hand, rising sea levels increase channel depths, aiding large containerships traveling to the Port of Virginia. Although clearances under bridges will be reduce[14], this is not expected to be a major problem since many important local bridges are drawbridges. Finally, airport runways or railroad lines located near or adjacent to coastlines may be impacted by rising sea levels and/or storm surge flooding.[15]

These issues are dependent upon the rate of relative sea level rise and the anticipated life expectancy of the structures. When a new roadway is constructed or improved, the new and projected sea levels should be considered as part of the design.

14 Ibid, p. 93.
15 Ibid, p. 93.

STRATEGIES TO ADDRESS SEA LEVEL RISE AND RECURRENT FLOODING

The HRTPO is committed—through facilitating partnerships and performing regional studies—to mitigating the impacts of sea level rise/storm surge on transportation infrastructure in Hampton Roads. Listed below are some recent and ongoing activities related to sea level rise and recurrent flooding that HRTPO staff are engaged in:

HRPDC/HRTPO PARTNERSHIP

- HRPDC performs various planning efforts, including coastal zone management, climate change, sea level rise, and green infrastructure

ENVIRONMENTAL SUSTAINABILITY BEST PRACTICES FOR TRANSPORTATION SYMPOSIUM

- National symposium which focused specifically on transportation planning and engineering best practices that can enhance the health of the environment

OTHER STAKEHOLDER PARTNERSHIPS

- Old Dominion University, University of Virginia, College of William & Mary, Virginia Polytechnic Institute and State University
- Virginia Institute of Marine Science (VMIS)
- HRPDC Coastal Resiliency Committee

SEA LEVEL RISE INTERGOVERNMENTAL PLANNING PILOT PROJECT

- The mission of the Pilot Project is to develop a regional "whole of government" and "whole of community" approach to sea level rise preparedness and resilience planning in Hampton Roads that also can be used as a template for other regions.

HAMPTON ROADS ADAPTION FORUM

- A forum to bring together professionals in adaptation including local municipal government staff, scientific experts, private sector engineers, state and federal agency staff, nongovernmental organizations, and other stakeholders to facilitate regional coordination, information exchange and share adaptation best practices.

HAMPTON ROADS DUTCH DIALOGUES

- A 5-day workshop held in June 2015 where Dutch and American urban designers, engineers, landscape architects, planners, academics, and government officials explored creative solutions and holistic concepts for flood risk reduction, resiliency, and smart redevelopment related to sea level rise and recurrent flooding.

USDOT/VOLPE PROJECT: TOOLS TO AUGMENT TRANSPORTATION INFRASTRUCTURE RESILIENCE AND DISASTER RECOVERY

- Objective: To develop a nationally replicable tool that incorporates the costs and benefits of resilience into the project prioritization process. The tool will augment existing prioritization tools and processes, where they exist, to estimate costs, regional economic impacts, and benefits and costs.

JOINT LAND USE STUDIES

- A cooperative planning effort that brings together military installations and their surrounding communities to jointly identify shared challenges and strategies typically related to land use compatibility and development that currently affect, or could affect, the military mission. Focus is on current and future challenges related to tidal flooding and sea level rise, particularly to roadways, that are already impacting cities and the strategic Navy military assets.

HRTPO Sea Level Rise/Storm Surge Planning Studies

In July 2013, HRTPO staff prepared Phase III of the Hampton Roads Military Transportation Needs Study: Roadways Serving the Military and Sea Level Rise/Storm Surge. In this report staff estimated sea level rise and potential storm surge threats to the Roadways Serving the Military network (established in Phase I – completed in September 2011), and recommended consideration of sea level rise/storm surge in project selection and design. With the forecast year of the next HRTPO being 2040, a 1.5-foot relative sea level rise scenario was used in addition to a 3-foot storm surge for a total of 4.5 feet of relative water rise. Phase III used elevation data from the HRPDC in conjunction with Geographic Information System (GIS) software to identify potential flooding to these significant military roadways.

In 2016, HRTPO staff completed Sea Level Rise and Storm Surge Impacts to Roadways in Hampton Roads. In this study, HRTPO staff partnered with Hampton Roads Planning District Commission (HRPDC) staff to conduct a comprehensive GIS-based flooding vulnerability analysis for potential sea level rise and storm surge impacts to regional roadways by 2045—the next Long-Range Transportation Plan (LRTP) horizon year. While it is important to plan and assess potential climate-based vulnerabilities to all land, air, and marine transportation systems, this study focuses on roadways within the Hampton Roads Metropolitan Planning Area (MPA), including bridges and tunnels.

The analyses within this study are intended to be a "high level" planning tool to screen regional roadway assets for vulnerability to flooding under three sea level rise and storm surge scenarios for the next long-range transportation planning horizon. Using elevation data from the HRPDC, segments from the "2045 Analysis Network" and "Existing Local Roadways" vulnerable to potential flooding under each of the three sea level rise and storm surge scenarios were identified (see Map 48). The results show that roadways in the Cities of Poquoson, Hampton, Portsmouth, Norfolk, Gloucester County, Chesapeake, York County and Virginia Beach are most vulnerable to potential future relative water rise.

Because of the disconnect between the timeframe of most metropolitan long-range transportation plans (20-25 years) and the 50-80 year timeframe associated with most climate change adaptation planning[16], the results in this study may also be used as a tool for developing future adaptation strategies beyond 2045. Some adaptation projects can be identified and implemented today. Other adaptation strategies that can be incorporated prior to the design and construction of new transportation infrastructure will reduce the impacts and consequences of climate change and help strengthen the overall resiliency of the transportation system.

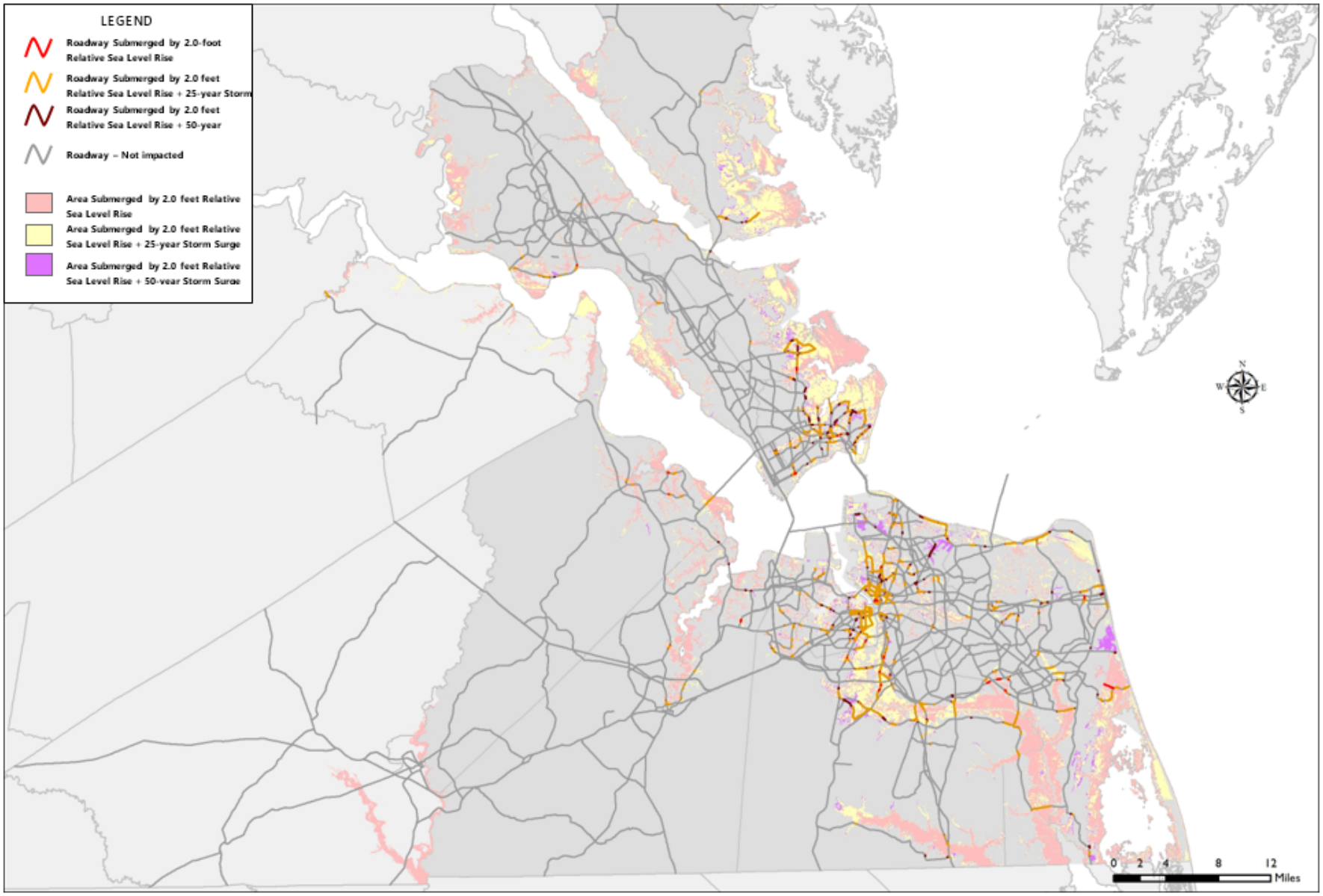
This report also includes a methodology for incorporating sea level rise and storm surge impacts to roadways into the HRTPO Long-Range Transportation Plan Project Prioritization Tool. Furthermore, it contains adaptation strategies, design considerations, best practices, and lessons learned from other coastal regions (e.g. Gulf Coast) that are also vulnerable to sea level rise and storm surge.

Update to the HRTPO Project Prioritization Tool

Evaluation criteria for the HRTPO Project Prioritization Tool are based on the current regional vision and can be modified to address changing regional priorities. In 2017, per the direction of the LRTP Subcommittee, HRTPO staff initiated a formal process to review and update the Project Prioritization Tool to incorporate feedback received from regional stakeholders as well as ensure continued alignment with Federal and State planning factors. Recommended enhancements to the Tool were developed through a collaborative process with various HRTPO committees, regional stakeholders, and the public. Among other enhancements, the Tool was updated to incorporate resiliency measures. The HRTPO Board approved the recommended enhancements at its July 16, 2020 meeting.

16 Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: The Gulf Coast Study, Phase 2, Task 3.2: Engineering Assessments of Climate Change Impacts and Adaptation Measures, August 2014.

Map 48: Future Vulnerability to Sea Level Rise in Hampton Roads



Data source for projected flooded areas: HRPDC Staff, October 2015

WATER QUALITY

Hampton Roads is defined by its relationship to the water. Industrial facilities such as shipyards and ports line the Elizabeth and James Rivers, while military facilities are found along every major shoreline in the region. Tourism, a major economic sector in the region, relies largely on the oceanfront and rivers throughout the area to act as magnets for visitors. The region also has strong cultural and economic ties to water-based industries such as oyster harvesting, fishing, and crabbing. Water quality can be impacted by excessive nutrient and sediment runoff caused by development and construction; therefore, runoff must be monitored, and its negative impacts minimized.

WATER QUALITY CHALLENGES

Transportation is a key contributor to water quality issues because it can increase the discharge of pollutants to water bodies in multiple ways. Construction of roadways generates sediment runoff that delivers nutrients to nearby waterbodies. Debris and oil deposited on roadways are also delivered to waterbodies during rain events. Motor vehicles that travel the roadways release nitrogen into the air through tailpipe emissions; this nitrogen then falls to the ground or directly enters waterbodies with precipitation.

The imperviousness of roadways contributes to an increase in the volume of stormwater runoff, which can overwhelm roadside drainage ditches. The ditches ultimately direct the runoff to nearby waterways through outfalls. The increased runoff volume promotes erosion of the receiving channel, which leads to damaged outfall structures and sediment discharges to local waterways.

WATER QUALITY STRATEGIES

The preferred management strategy is to retain and treat stormwater runoff close to the source. Though there is growing interest in treating roadway runoff by installing stormwater management practices in rights-of-way, implementation alongside larger roadways is challenging. Bioretention stormwater management practices use plantings and engineered soil media to retain and treat stormwater runoff. Practices like these, which require regular maintenance, can be difficult to access in the right-of-way and would need careful design considerations to prevent plantings interfering with sightlines for vehicle operators.

In response to the negative impacts on water quality by industry and development, the federal government and the Commonwealth of Virginia have taken steps to improve the health of the Chesapeake Bay and its

James River Wetlands

Stormwater Outfall

tributaries. In 2014, Virginia revised stormwater management regulations that require new developments and redevelopments, including roadways and other transportation infrastructure, to meet more stringent requirements regarding nutrient pollution and runoff.

Based on these new regulations, new construction, including transportation projects, cannot increase current levels of nutrient pollution and runoff. Furthermore, any redevelopment must reduce current levels of nutrient pollution and runoff associated with the existing development by 20 percent.

Roadside Bioretention Practice

AIR QUALITY

CHALLENGES TO MAINTAINING CLEAN AIR

Maintaining clean air in Hampton Roads is an important issue as air quality affects the health and well-being of residents, workers, and visitors in the region. Air pollution can irritate the eyes, nose, and throat; it can even trigger respiratory problems. Air pollution can also damage both the natural environment (trees, plants, crops) and the built environment (buildings, bridges, monuments).

Current Status and Trends

Table 2 presents the National Ambient Air Quality Standards (NAAQS) established by the US Environmental Protection Agency (EPA) for criteria air pollutants, namely: carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), particulate matter (PM), nitrogen dioxide (NO_2), and lead (Pb). There are two types of NAAQS — Primary and Secondary[1]:

- Primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly.
- Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The NAAQS are reviewed and updated as needed by EPA on a five-year cycle.

Hampton Roads is in attainment of all the NAAQS. The Virginia Department of Environmental Quality (VDEQ) issues an annual report summarizing air quality monitoring data for the previous year and updating long-term trend data[2]. Figures 40 and 41 are excerpts for the Tidewater area from the most recent update (2018) to that report, and show trends in ambient concentrations over the past decade for two criteria pollutants:

- Ozone – a regional air pollutant formed in the atmosphere from chemical reactions of emissions from a wide variety of sources, including on-road motor vehicles, industry, etc.
- Carbon monoxide (CO) – an air pollutant for which exhaust from on-road motor vehicles have been a major source in the past but whose emissions are now largely minimized due to exhaust and fuel quality standards that have been made increasingly more stringent over time

As shown in the exhibits on the following pages, ozone levels in the region, while variable, are below the current NAAQS and generally trending downwards, while CO levels have long been and remain substantially below the NAAQS.


Photo Cred: Virginian Pilot

1 https://www.epa.gov/criteria-air-pollutants/naaqs-table
2 http://www.deq.virginia.gov/Programs/Air/AirMonitoring/Publications.aspx

Table 2: National Ambient Air Quality Standards

Pollutant		Primary/Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m³ (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	PM 2.5	primary	1 year	12.0 µg/m³	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m³	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m³	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m³	Not to be exceeded more than once per year over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.

(2) The level of the annual NO2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Source: US EPA website (accessed 9/15/2020): ***https://www.epa.gov/criteria-air-pollutants/naaqs-table***

Figure 40: Trend for the Eight-Hour Ozone Concentrations in Hampton Roads

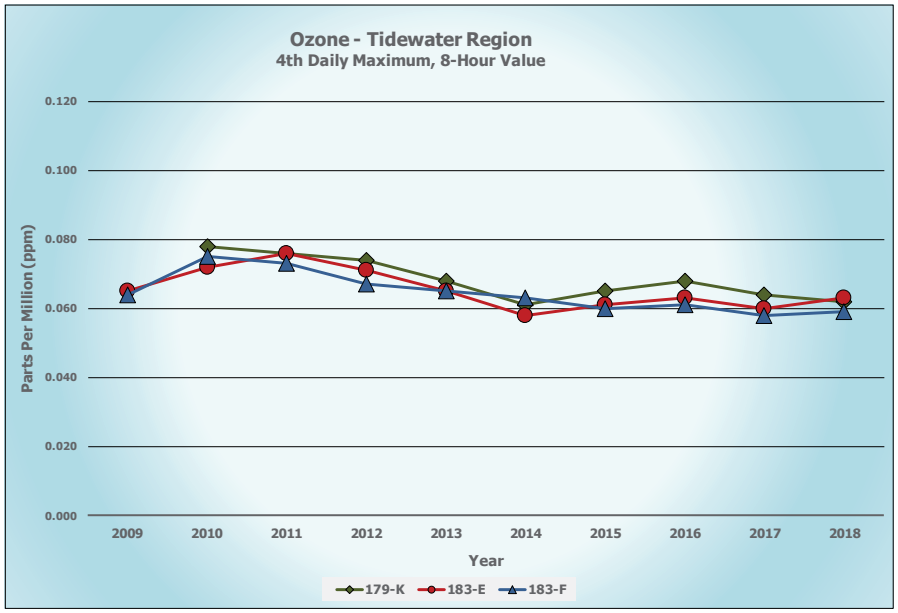
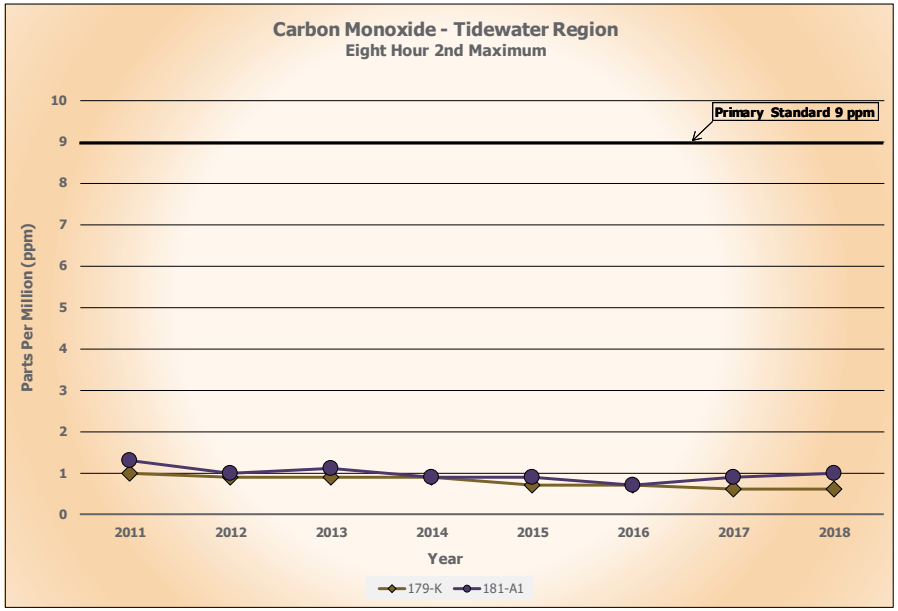


Figure 41: Trend in Ambient CO Concentrations in Hampton Roads



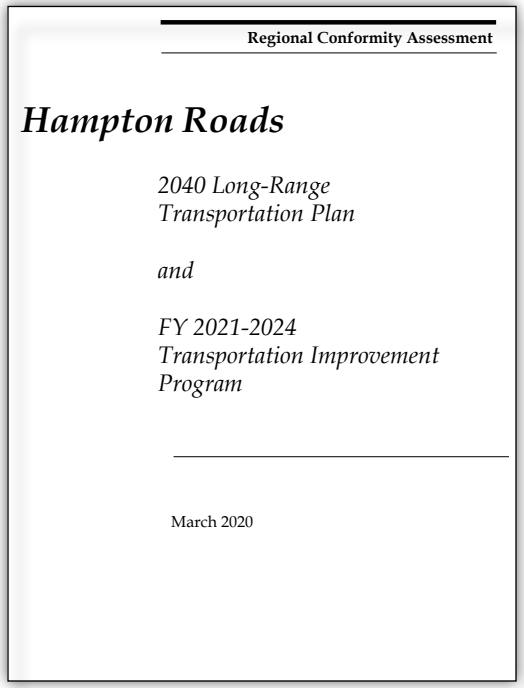
Source: Virginia Department of Environmental Quality, "Virginia Ambient Air Monitoring 2018 Data Report", October 2019.
See: http://www.deq.virginia.gov/Programs/Air/AirMonitoring/Publications.aspx

STRATEGIES FOR IMPROVING AIR QUALITY

Transportation Conformity

The region's current 2040 LRTP and FY 2021-2024 Transportation Improvement Program have met all applicable federal, state, and local requirements relating to the EPA transportation conformity rule (40 CFR Parts 51 and 93). The updated 2045 LRTP will likewise meet all applicable requirements.

For background, the EPA transportation conformity rule was originally intended to ensure regional transportation plans and programs are consistent with or "conform" to the regional air quality plan for areas that fail to attain the NAAQS, or for a limited time those that have failed in the past. The Hampton Roads region was previously subject to the detailed requirements of the conformity rule for the 1997 NAAQS for ozone, but that ended when EPA revoked that standard effective April 6, 2015[3] (a more stringent standard for ozone was promulgated by EPA the same year, with which the region has been and remains in attainment).[4] In February 2018, a United States Court of Appeals ruling in South Coast Air Quality Mgmt. District v. EPA (South Coast II) effectively reinstated conformity requirements nationwide for the revoked 1997 ozone NAAQS as a stated means to avoid backsliding on emission controls for areas that previously failed to meet that NAAQS even if they meet more stringent standards now. EPA issued guidance in November 2018 that substantially streamlined conformity requirements and reduced the administrative burden for areas, including the Hampton Roads region, that were affected by the South Coast II court ruling.


Regional Conformity Assessment

Hampton Roads

2040 Long-Range Transportation Plan

and

FY 2021-2024 Transportation Improvement Program

March 2020

3 https://www.govinfo.gov/content/pkg/FR-2015-03-06/pdf/2015-04012.pdf
4 https://www.govinfo.gov/content/pkg/FR-2015-10-26/pdf/2015-26594.pdf

ENVIRONMENTALLY SENSITIVE LANDS

ENVIRONMENTAL MITIGATION CHALLENGES

Maintaining the quality of environmentally sensitive lands is an important part of the region's overall natural resource conservation strategy. However, new construction and development can stress or harm these areas. Transportation infrastructure can have large impacts on where and how development occurs in the region, and how this development can impact environmentally sensitive lands.

ENVIRONMENTAL MITIGATION STRATEGIES

Environmental Mitigation links transportation planning to the environment via consultation and discussion with environmental agencies. Fixing America's Surface Transportation Act (FAST Act), the authorization that governs the Nation's transportation funding and replaces the previous transportation legislation MAP-21, reinforces provisions for Environmental Mitigation, stating that environmental agencies must be consulted regarding the development of the LRTP. FAST Act continues to encourage the streamlining of the environmental review process and reiterates the need, as previously legislation did, for a discussion in the planning process that addresses Environmental Mitigation.

The goals of Environmental Mitigation are to:

- Identify open space areas that can be preserved
- Reduce impacts where transportation and sensitive lands intersect
- Emphasize the importance of integrating/consideration of wildlife and habitat into the design of transportation facilities
- Maintaining, or improving, water and air quality
- Protecting historical and cultural resources
- Encourage member localities to ensure that transportation projects are consistent with the LRTP and other federal, state, and local plans

Figure 42: HRTPO Efforts to Link Transportation and Environmental Planning

ENVIRONMENTAL MITIGATION CONSULTATION AND DISCUSSION	Regional Resource Agencies consulted regarding the development of the LRTP
IDENTIFICATION AND CONSIDERATION OF NATURAL AND CULTURAL ISSUES	Regional Environmental Agencies consulted regarding LRTP candidate projects
REGIONAL LAND USE	Existing and Future Land Use data maintained, used in regional planning efforts, and shared with regional partners
PROJECT PRIORITIZATION	Criteria considers community accessibility, land use compatibility, and economic impacts Enhancements include resiliency, economic distress factors, and environmental considerations Data/Evaluation shared with regional partners
TITLE VI/ ENVIRONMENTAL JUSTICE METHODOLOGY	Evaluates candidate projects in relation to identified Title VI/EJ communities and assesses potential impacts Identifies public participation strategies that can be used as a project advances in design

In addition to Environmental Mitigation, HRTPO staff actively participates in other efforts to further link transportation and environmental planning. Tasks and activities HRTPO staff have implemented or improved to better consider environmental, community, and economic goals early in the transportation planning process are listed in Figure 40.

ENVIRONMENTAL AGENCIES CONSULTED DURING THE DEVELOPMENT OF THE 2045 LRTP

FEDERAL AGENCIES

US ENVIRONMENTAL PROTECTION AGENCY (EPA)

US ARMY CORPS OF ENGINEERS (USACE)

US DEPARTMENT OF AGRICULTURE (USDA)

NATIONAL PARK SERVICE (NPS)

US FISH AND WILDLIFE SERVICE (USFWS)

US GEOLOGICAL SURVEY (USGS)

FEDERAL HIGHWAY ADMINISTRATION (FHWA)

FEDERAL TRANSIT ADMINISTRATION (FTA)

FEDERAL RAILROAD ADMINISTRATION (FRA)

STATE AGENCIES

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY (VDEQ)

VIRGINIA MARINE RESOURCES COMMISSION (VMRC)

VIRGINIA CLEAN CITIES (VCC)

VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION (VDCR)

VIRGINIA DEPARTMENT OF FORESTRY (VDOF)

VIRGINIA DEPARTMENT OF HISTORIC RESOURCES (VDHR)

VIRGINIA DEPARTMENT OF GAME AND INLAND FISHERIES (VDGIF)

VIRGINIA STATE RECOGNIZED INDIAN TRIBES

Consultation: Development of the LRTP

Locality staff and other regional stakeholders across Hampton Roads participate in the development of the LRTP. To date, stakeholders have assisted in:

- Development of the vision, goals, and objectives
- Update and allocation of forecasted land use and socioeconomic data
- Development of a framework for scenario planning
- Collection and refinement of candidate projects
- Review of a Title VI/Environmental Justice analysis of candidate projects
- Provision/review of data for project evaluation and prioritization

Looking ahead, stakeholders will also help select projects for the plan based on fiscal constraint.

Environmental agencies were also consulted as part of the development of the LRTP. Tables and maps of the candidate projects being considered for inclusion in the 2045 LRTP were sent to the agencies listed on the left of the page, with a request for feedback on projects based on their respective area of expertise.

Consultation: The Environmental Mitigation Discussion

In addition to the solicitation for feedback regarding candidate projects, several state environmental agencies were also asked to comment on text (referred to as the Environmental Mitigation Discussion text) that explains the relationship between environmental and transportation planning, as well as the need and purpose in coordination between the two fields. The environmental mitigation discussion text and associated summary table are based on text developed by VDOT staff for use by MPOs around the state. The text and table explain the metropolitan transportation planning process as well as the need and use of the regional LRTP. Furthermore, the text explains the environmental considerations at varying stages of project development, including examples of potential environmental mitigation activities.

Environmental mitigation materials were sent to the listed environmental agencies, with a request for feedback based on their respective area of expertise.

A response was received from the National Park Service stating that they reviewed the 2045 LRTP letter and draft mitigation table and that they also coordinated the information with the Colonial National Historic Park. The NPS did not have comments at the time but asked to be kept updated as the LRTP progresses towards adoption. A copy of the complete correspondence can be found in Appendix A.

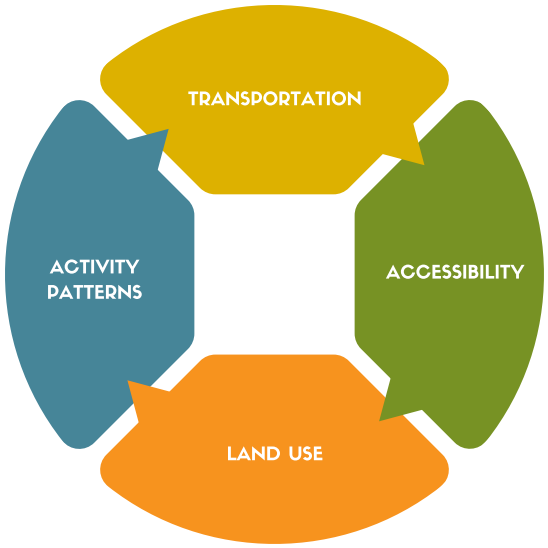
Spatial Overlay Analysis

As part of the development of the 2045 LRTP, a spatial overlay analysis using Geographic Information Systems (GIS) – a framework for gathering, managing, and analyzing data – was done. Specifically, this analysis involved overlaying candidate projects with various geographies to determine potential interactions, including environmental datasets. The results from this spatial overlay analysis is documented in the *Hampton Roads 2045 LRTP: Regional Needs* report. Results will also feed into the HRTPO Project Prioritization Tool.

LAND USE AND TRANSPORTATION

Transportation systems and land use patterns are interdependent and directly influence each other. Development density and location influence regional travel patterns, and, in turn, the degree of access provided by the transportation system can influence land use and development trends. Denser urban centers with a connected system of streets have more flexibility to combine different land uses in closer proximity, encouraging travel by foot, bicycle, and public transportation, in addition to automobiles. On the other hand, a dispersed pattern of low-density development away from urban centers relies almost exclusively on vehicular travel as the primary mode for transportation.

Figure 43: HRTPO Efforts to Link Transportation and Environmental Planning



LAND USE COORDINATION CHALLENGES

Up to this point, the challenges presented in this section discuss how transportation either impacts or is impacted by the environment. Land use alone is not necessarily an environmental challenge. The real challenge is better integration of land use and transportation planning; a lack of integrated planning can have environmental implications.

From a transportation perspective, planning for increased traffic due to growth is not the biggest challenge; instead, the biggest hurdles will come with planning for where and how this increased traffic will be accommodated within the existing pattern of land use. In other words, the type and distribution of growth impacts the transportation system differently. Since the relationship between land use and transportation planning is symbiotic, better coordination between the transportation planners and land use planners will help to minimize impacts to the environment. The key challenge moving forward will be to better.

LAND USE COORDINATION STRATEGIES

New federal programs and policies are now strongly encouraging multidisciplinary and coordinated approaches to development. This improved integrated planning will help maximize benefits of development while minimizing the negative impacts to the region's natural and financial resources; in essence, helping the region to get the most "bang for its buck."

The HRTPO has taken several steps to better integrate land use and transportation in their planning efforts. One of those efforts included developing the Regional Land Use Map, which was recently updated as part of the development of the 2045 LRTP. The Regional Land Use Map depicts the existing and anticipated future land uses of the region. The map can be used as a tool to integrate other planning issues with land use and transportation such as: emergency management, water resource planning, green infrastructure management, housing development, and economic development. Decision-making with the use of tools such as the Regional Land Use Map can help promote cost-effective investments in the community.

As part of the development of the 2045 LRTP, and in conjunction with another regional effort – the Regional Connectors Study, scenario planning is being implemented that will analyze multiple future scenarios. These scenarios have distinguishing land use, freight, and transportation technology assumptions; candidate projects will be evaluated in each of the scenarios to identify the most robust projects for the region. By employing scenario planning in this exploratory manner, regional stakeholders can investigate plausible alternate futures and their potential impacts on the transportation system.

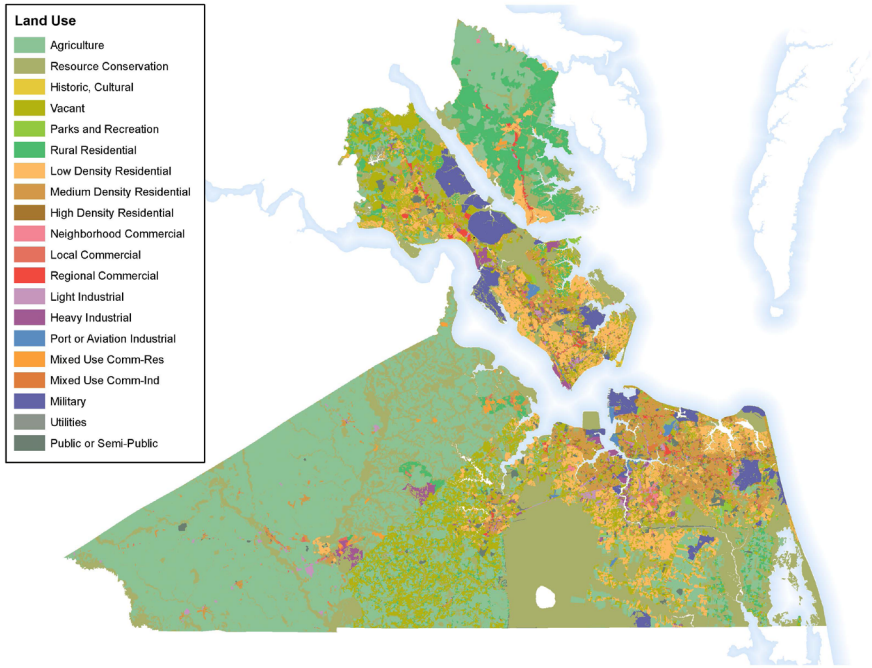
Another effort includes incorporating land use and transportation planning into Envision Hampton Roads, which is the Region's Strategic Planning process led by the HRPDC. The goal of this effort is to build regional collaboration and develop a shared Regional Vision.

More information on Envision Hampton Roads is included at http://www.envisionhamptonroads.com.

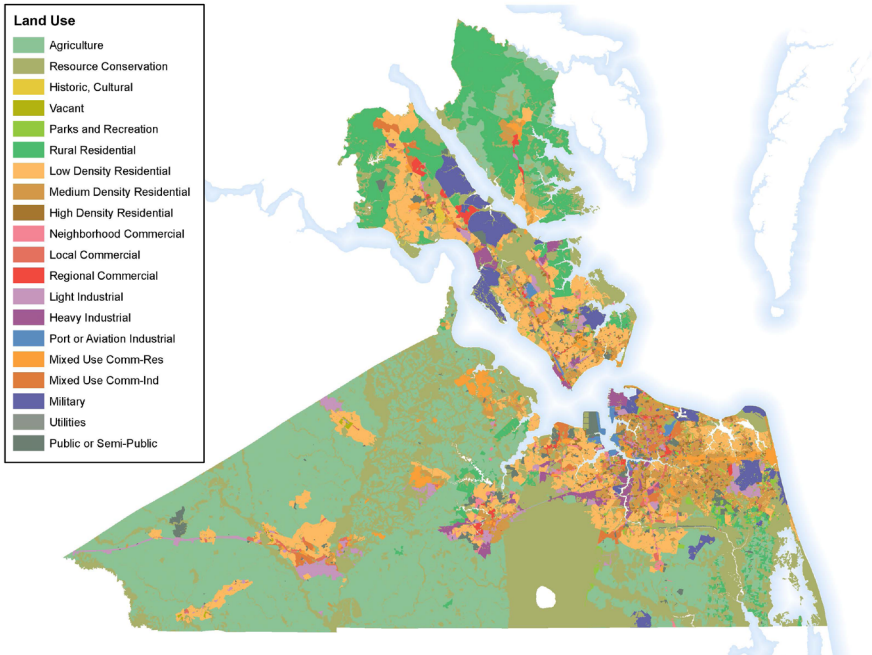
REGIONAL CONNECTORS STUDY

ENVISION Hampton Roads
Our Region • Our Future

Map 49: Virtual Present (2015) Regional Land Use Map



Map 50: Virtual Future (2015) Regional Land Use Map



Data Source: HRTPO/HRPDC

6

CHAPTER 6: TRANSPORTATION FINANCE

TRANSPORTATION FUNDING

As with the rest of the nation, the Hampton Roads region has felt the impact of transportation funding shortfalls in recent years. These shortfalls have prompted many states, regions, and localities to develop an array of funding mechanisms to begin the process of filling the transportation funding gap.

CHALLENGES AT NATIONAL LEVEL

Part of the funding for the Hampton Roads transportation network originates at the Federal level. Federal transportation funding, administered by the U.S. Department of Transportation, is generated from user fees – motor fuel and motor vehicle taxes – applied nationally and distributed to states and transit agencies by formula. Since 1956, these taxes have been allocated to the Highway Trust Fund (HTF), a fund dedicated to the maintenance, improvement, and expansion of the national transportation system. The federal gas tax was last raised in 1993 and is still set at 18.4 cents per gallon.

Congress has provided continuing authorization of the HTF via various multi-year transportation reauthorization bills. Previously, the Moving Ahead for Progress in the 21st Century Act (MAP-21) was the authorization that governed the Nation's Federal surface transportation funding. Signed into law on July 6, 2012, this act went into effect on October 1, 2012. MAP-21 replaced the previous authorization, the Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users (SAFETEA-LU), by consolidating programs, streamlining project delivery, enhancing highway safety, increasing the focus on freight, expanding the Transportation Infrastructure Finance and Innovation Act (TIFIA) program and tolling authority, and implementing performance measures and targets. On December 4, 2015, President Obama signed into law the Fixing America's Surface Transportation Act (FAST Act), the first Federal law in over 10 years to provide long-term funding certainty for surface transportation. The Fast Act replaces MAP-21 and authorizes $305 billion over five years (fiscal years 2016-2020) for highway, public transportation, rail, research, technology, and safety programs. A major theme of the FAST Act is accelerated project delivery.

The HTF and the revenue sources that support it have been reliable mechanisms for financing highway and transit programs for five decades; however, with technological advancements in the auto industry, more fuel efficient cars are being developed. As a result, these more efficient cars consume less fuel and therefore, less fuel tax is collected. Consequently, fuel taxes, which currently provide most of the revenue for surface transportation, are unlikely to continue to provide a stable and lasting foundation to improve and maintain the Nation's highway system. This decline in fuel tax collection along with a leveling off in the vehicle miles traveled on the national roadway system, and a shrinking HTF, has resulted in traditional transportation funding system to move in an unsustainable direction. This challenge dominates transportation debates not only in Washington, but in state capitals across the country, including Richmond.

CHALLENGES AT THE STATE LEVEL

Virginia operates the third largest highway system in the country, just behind North Carolina and Texas.

The 57,867 mile state-maintained system is divided into these categories:

Interstate – 1,118 miles of four to ten lane highways that connect states and major cities

Primary – 8,111 miles of two to six lane roads connecting cities and towns with each other and the interstates

Secondary – 48,305 miles of local connector or county roads

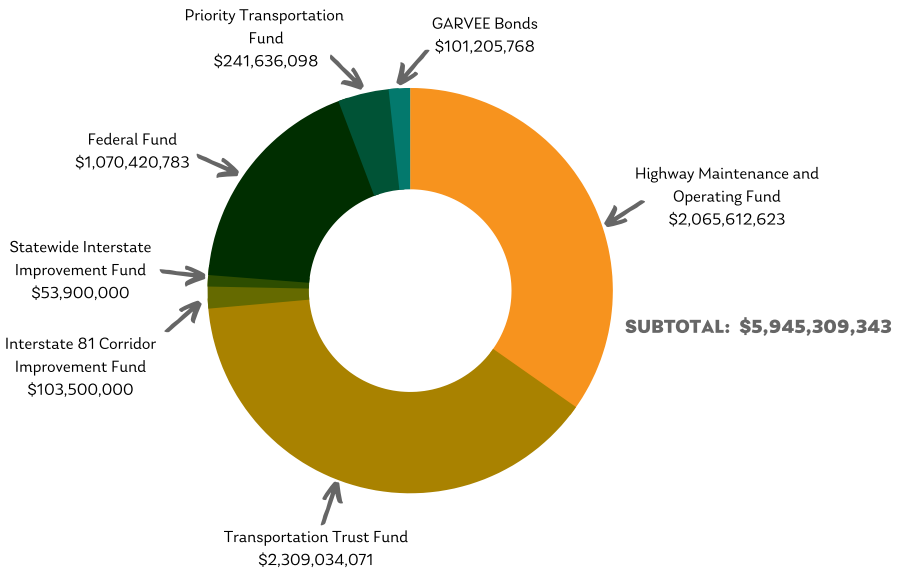
Frontage – 333 miles of frontage roads

A separate system includes 10,561 miles of urban streets that are maintained by cities and towns with the help of state funds.

Funding for VDOT's activities is derived from several revenue sources – the largest being Federal (Figure 43). The majority of the state's transportation revenues are generated from taxes and user fees. Virginia regulations require the allocation of transportation revenues primarily from two funds, each designated for specific purposes: the Highway Maintenance and Operating Fund (HMOF) and the Transportation Trust Fund (TTF). The HMOF disburses funding for transportation maintenance projects and the TTF provides funding for transportation capital improvements (construction projects).

Virginia law requires VDOT to fully fund maintenance and operations before funding the construction of any new infrastructure. Historically, Virginia's transportation revenues have provided sufficient funds to meet maintenance needs while allowing residual funds to be transferred to the TTF construction fund. However, since FY 2002, the reverse has been occurring: funds from Virginia's construction fund have been diverted annually to the HMOF to cover Virginia's growing maintenance and operations needs. The transfer of funds from construction to maintenance for FY 2020 is $134 million which is 6% of the total maintenance budget for the year (Figure 44).

Figure 44: Sources of Statewide Transportation Funds FY2020



SUBTOTAL: $5,945,309,343

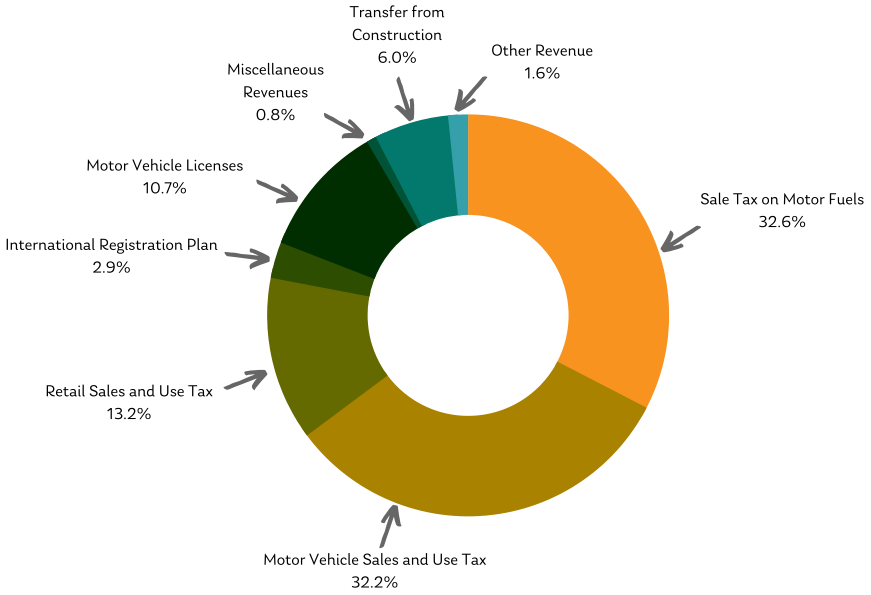
PASS THROUGH REVENUES

NORTHERN VIRGINI TRANSPORTATION AUTHORITY FUND - $283,400,000

HAMPTON ROADS TRANSPORTATION FUND - $201,700,000

TOTAL FUNDS: $6,430,409,343

Figure 45: Virginia HMOF Revenue Sources FY2020



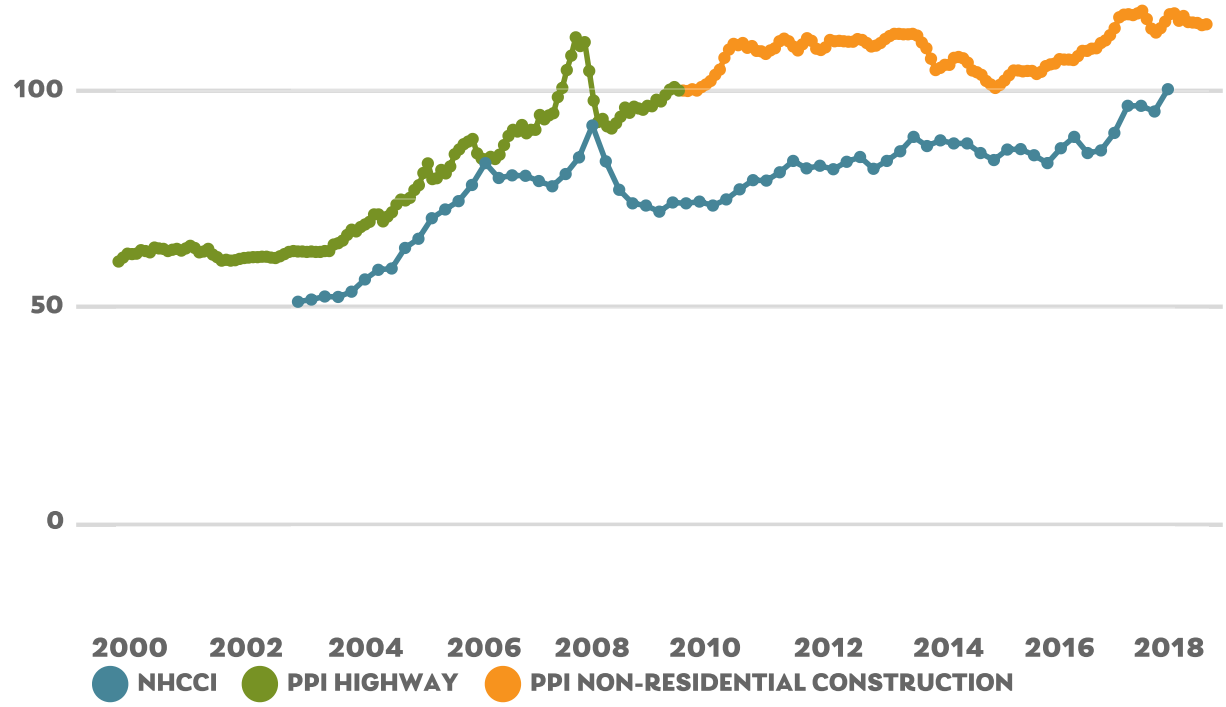
Source: Virginia Department of Transportation Revised Annual Budget FY 2020.

CONSTRUCTION COST INCREASES

Many factors determine the cost of inputs to highway construction and as the market for inputs changes, so do the construction costs. U.S. highway construction costs grew rapidly from 2003 through 2008, reflecting both high prices for petroleum (and other energy sources) as well as a high cost/overheated construction market both nationally and internationally. With the onset of the 2007 recession, both the Producer Price Index for Bridge and Highway Construction (PPI Highway) and the National Highway Construction Cost Index (NHCCI) fell, but recovery costs have been on the rise more recently. In 2015, the Federal Highway Administration reviewed the methodology and input data for calculating the NHCCI and issued a revision back through 2003, now referred to as NHCCI 2.0. The NHCCI reflects not just materials, but also labor, services, and profits for contractors.

Since 2010, the NHCCI has increased by 35%, roughly an average of 4% per year; while the input costs for heavy construction (PPI Non-Residential Construction) has increased by 15.2%, or 1.8% per year on average. A confluence of increased costs of building materials like asphalt, concrete and metal, a weak U.S. construction sector, regulations, and rising costs of administration within the industry play a part in the increased costs of highway projects over the past few years.

Figure 46: Highway Construction Cost Growth, 2000-2019



Data Source: USDOT

TRANSPORTATION FUNDING STRATEGIES

Recognizing that funding transportation is one of the key issues facing the Commonwealth, the Virginia General Assembly passed a series of transportation bills that were enacted to provide some relief for the current financial challenges. The key pieces of transportation legislation that have been passed in the last few years include House Bill (HB) 2313 (2013), HB 1253 (2014), HB 2 (2014), HB 1886 (2015), HB 1887 (2015), HB 768 (2018), HB 1414 (2020), and Senate Bill 1038 (2020).

House Bill 2313 (2013)

The passage of this law overhauled Virginia's transportation funding and created the Hampton Roads Transportation Fund (HRTF). Per HB 2313, the HRTPO was identified as the agency to direct the use of the HRTF monies. The issue of securing bonds for project financing was not addressed in this legislation.

House Bill 1253 (2014)

House Bill 1253 created the Hampton Roads Transportation Accountability Commission (HRTAC). The enacted legislation transferred the authority of directing the use of HRTF monies from the HRTPO to the HRTAC. HRTAC does not replace HRTPO planning/programming functions, and HRTAC's funding plan must align with the Statewide Transportation Plan. More information on HRTAC is provided later in this section.

House Bill 2 (2014)

HB2 Funding the Right Transportation Projects

House Bill 2 (HB2) required that the Commonwealth Transportation Board (CTB) develop a statewide prioritization process for capacity expansion projects based on a comparison of a project's relative benefits to its cost. This process must be used to develop the Six-Year Improvement Program (SYIP) for the State of Virginia and the funds that must be prioritized include state and federal highway funds.

Some of the key goals of the Statewide HB2 Prioritization Process include the promotion of performance in the selection of projects, providing stability to the SYIP, and to establish a pipeline of projects that link planning to programming. HB2 (2014) later becomes SMART SCALE.

The HB2 process is based on five categories:

- Project Submission
  - Corridors of Statewide Significance
  - Regional Networks
  - Improvements to promote Urban Development Areas (UDA)
- Funding
- Measures to evaluate each of the following criteria (factor):
  - Safety
  - Congestion Mitigation
  - Accessibility
  - Environmental Quality
  - Economic Development
  - Land Use & Transportation Coordination
- Weighting of the criteria listed above for different area types
- Other Issues

House Bill 1886 (2015)

Public-Private Partnerships (P3s) are projects which are funded and operated through a partnership of a government entity and one or more private sector companies. The Public-Private Transportation Act (HB 1886) requires a finding of public interest on transportation projects, establishes the P3 Steering Committee, requires the certification and incorporation of a public finding in all comprehensive agreements, and requires VDOT to have a process in place for identifying high-risk projects and a procurement process for such projects to ensure that the public interest is protected.

House Bill 1887 (2015)

The transportation funding formula, reporting, and allocations legislation (HB 1887) does not include new revenues for transportation. The act replaces the current allocation formula (40% primary – 30% secondary – 30% urban) for construction projects with the following beginning in FY 2021:

- 45% to rebuild deteriorated pavement and bridges within the state's interstate and primary highway system (includes routes and bridges maintained by cities and towns).
- 27.5% for projects (including rail and transit) that reduce congestion along statewide corridors and within regional networks.
- 27.5% for construction district grants to fund projects that address needs identified in the Statewide Transportation Improvement Plan.

SMART SCALE is the method of scoring planned projects included in VTrans that are funded by HB 1887. Transportation projects are scored based on an objective, outcome-based process that is transparent to the public and allows decision-makers to be held accountable to taxpayers. Once projects are scored and prioritized, the CTB has the best information possible to select the right projects for funding. More information about the SMART SCALE project prioritization process, including a technical guide for applicants is available at ***www.vasmartscale.org***

House Bill 768 (2018)

Approved by the General Assembly and signed into law in 2018, HB 768 establishes a floor on the 2.1 percent sales tax imposed on motor vehicles sold in Northern Virginia and Hampton Roads. The legislation sets the average distributor price upon which the tax is based be no less than what the statewide average distributor price would have been on February 20, 2013. The bill defines "average distributor price."

House Bill 1414 (2020)

Signed into law in 2020, this bill adopts many structural changes to the transportation funding system in the Commonwealth of Virginia. Numerous laws related to transportation funds, revenue sources, construction, and safety programs have been amended. One of the components of the bill converts the existing gas tax based on a percentage of the wholesale price of gasoline and diesel fuel to a cents-per-gallon tax.

Senate Bill 1038 (2020)

In 2020, the Virginia General Assembly passed Senate Bill (SB) 1038 and HB 1726 (identical bills), which created the Hampton Roads Regional Transit Program (HRRTP) and the Hampton Roads Regional Transit Fund (HRRTF) to develop, maintain, and improve a core regional network of transit routes, related infrastructure, rolling stock, and support facilities that have the greatest impacts on: economic development potential, employment opportunities, mobility, environmental sustainability, and quality of life. The goal is to provide a modern, safe, and efficient core network of transit services across the Hampton Roads region.

This legislation created the first dedicated transit funding for Hampton Roads to be used in the Hampton Roads Transit (HRT) service area. The funds cannot be used to expand light rail beyond boundaries of Norfolk and will be managed by the Hampton Roads Transportation Accountability Commission (HRTAC).

The fees and taxes are applied in the six localities served by HRT (Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, Virginia Beach): the HRRTF is generated by $20 million per year from statewide recordation taxes, additional grantor's tax of $0.06 per $100 real estate value conveyed, and a regional transient occupancy tax of 1% of the charge for occupancy.

In accordance with the legislation, the HRTPO shall establish a Regional Transit Advisory Panel composed of representatives of major business and industry groups, major shopping destinations, major employers, military installations, public transit entities, institutions of higher education, hospitals and health care centers, and other groups identified as necessary. The Panel is to provide ongoing advice to the regional planning process on the long-term vision for a multimodal regional public transit network in Hampton Roads.

Additional Funding Sources

There are two new Federal funding opportunities for eligible applicants through the Better Utilizing Investments to Leverage Development (BUILD) and the Infrastructure for Rebuilding America (INFRA) transportation funding programs.

BUILD transportation grants are federal funds to be awarded on a competitive basis for surface transportation infrastructure projects that

will have a significant local or regional impact. Eligible applicants for BUILD grants are State, local, tribal governments, U.S. territories, transit agencies, port authorities, MPOs, and other political subdivisions of State or local governments.

The **INFRA** program provides Federal financial assistance to highway and freight projects of national or regional significance. Eligible applicants for INFRA grants are a State or group of States, local or group of local governments, tribal governments, U.S. territories, transit agencies, port authorities, MPOs, other political subdivisions of State or local governments, a special purpose district or public authority with a transportation function, a Federal land management agency that applies with a State or group of States, and a multi-State or multi-jurisdictional group of public entities.

In addition to the aforementioned transportation funding opportunities, the HRTPO has investigated the application of other non-traditional funding sources in order to advance projects, including local funding, tolls, and Public-Private Partnerships (P3).

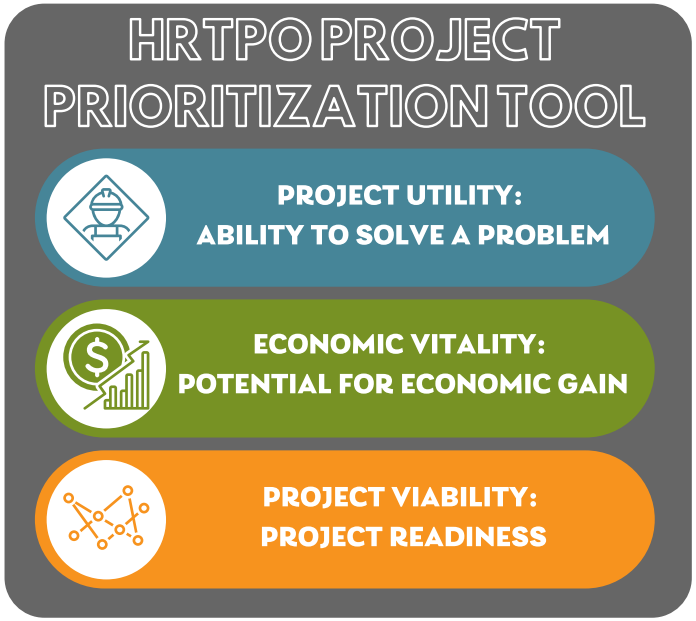
Several major public-private transportation projects, such as the widening of Dominion Boulevard in Chesapeake, the construction of a new tube for the Midtown Tunnel between Norfolk and Portsmouth, reconstruction of the Downtown Tunnel, and the U.S. Route 460 Corridor Improvement Project, have prompted the passage of additional legislation to further refine the oversight capabilities on P3 projects (HB 1886).

Project Prioritization

Another strategy used by the HRTPO to advance regional transportation investments with scarce financial resources is the evaluation of transportation projects with the HRTPO Project Prioritization Tool.

In July 2009, the HRTPO, with the support of VDOT and its consultant Kimley-Horn and Associates, embarked on the development of an objective and data-driven prioritization tool to evaluate regional transportation investments. The HRTPO Project Prioritization Tool evaluates candidate regional transportation projects based on technical merits and regional benefits. The Tool has been used in the previous 2 LRTPs and in the identification of the Regional Priority Projects. As part of the development of the 2045 LRTP, the Tool was updated to include, among other enhancements, resiliency and environmental measures.

To learn more about the HRTPO Project Prioritization Tool, visit https://www.hrtpo.org/page/project-prioritization/.



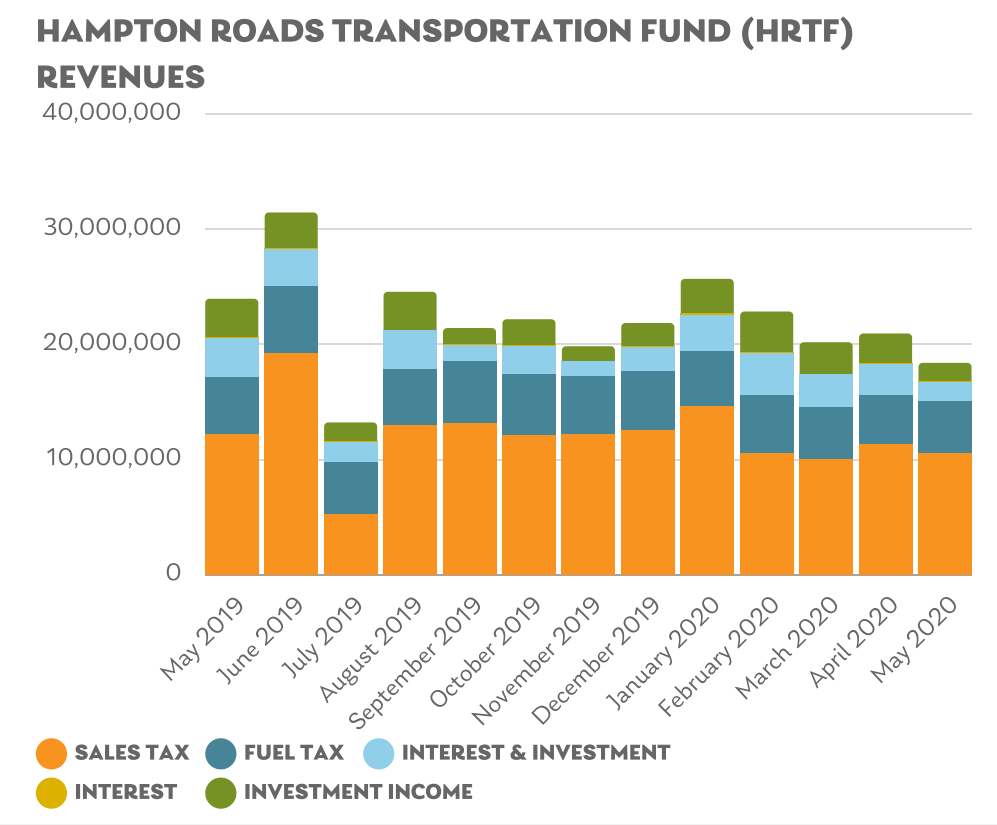
HAMPTON ROADS TRANSPORTATION ACCOUNTABILITY COMMISSION (HRTAC)

In 2013, Virginia overhauled their transportation funding model with House Bill 2013 (HB 2313) and created the Hampton Roads Transportation Fund (HRTF). HB 2313 did not address some key points such as issuing bonds secured by the fund. This prompted the passage, in 2014, of HB 1253 which created the Hampton Roads Transportation Accountability Commission (HRTAC) with the power to issue bonds and the authority to administer the HRTF. The HRTAC does not replace the planning and programming functions of the Hampton Roads Transportation Planning Organization (HRTPO) and HRTAC's funding plan must align with the Statewide Transportation Plan.

Some key components of the HRTAC include:

- HRTAC is a political subdivision of the Commonwealth
- Primarily funded with HB 2313 revenue (HRTF) approved by the 2013 General Assembly
  - ◇ "the moneys deposited in the fund shall be used solely for new construction projects on new or existing highways, bridges, and tunnels in the localities comprising Planning District 23"
  - ◇ "[HRTAC] shall give priority to those projects that are expected to provide the greatest impact on reducing congestion for the greatest number of citizens" and "shall ensure that the moneys shall be used for such construction projects."

Figure 47: Hampton Roads Transportation Fund (HRTF) Revenues

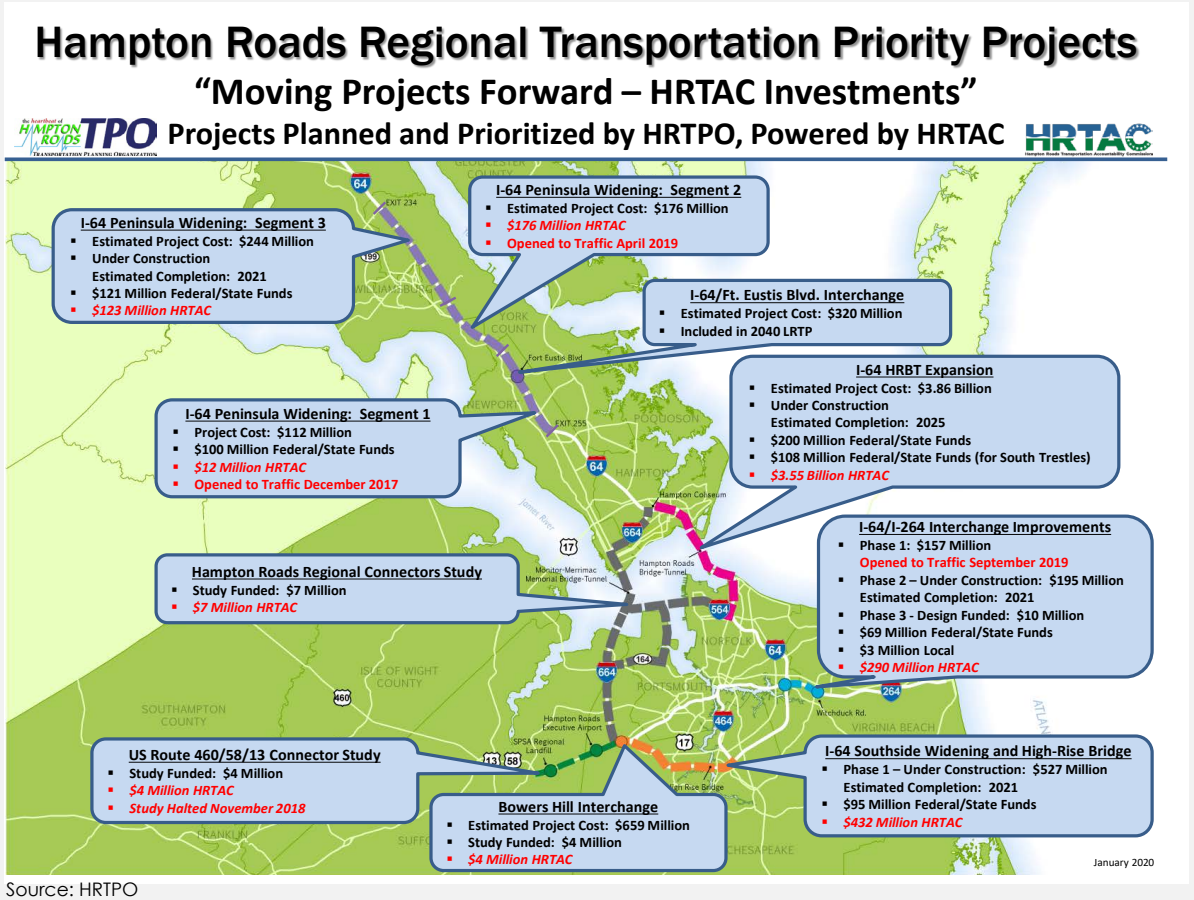


Source: Provided by HRTAC

The HRTPO Board approved a list of Candidate Projects in October 2013 to be funded, in part, with HRTF revenues (Map 28). Some of the allocations that have been made by the HRTAC on those projects include:

- I-64 Peninsula Widening: Segment 1 - $12 million. Segment 2 - $176 million. Segment 3 - $123 million.
- I-64/264 Interchange Improvement: Phase 1-$157 million. Phase 2 - $195 million. Phase 3 Study - $10 million.
- I-64 Southside Widening & Replace High-Rise Bridge: HRTF Allocation of $432 million.
- I-64 HRBT Expansion: HRTF Allocation of $3.55 billion.
- Bowers Hill Interchange: Study funded for $4 million.

Map 51: Hampton Roads Transportation Accountability Commission (HRTAC) Projects



Source: HRTPO

7

CHAPTER 7: PERFORMANCE MANAGEMENT

SYSTEM MONITORING

HRTPO staff constantly monitors the areas described in this report, through recurring and special studies. Figure 42 illustrate some of the regional studies that have been completed by HRTPO over the last five years.

Figure 48: Recurring and Special Studies

HRTPO also monitors the regional transportation system through a cyclical performance management process:

- The HRTPO measures the performance of the transportation network to identify needs
- The HRTPO estimates the impact of candidate transportation projects, then:
  - plans transportation projects (via the Long-Range Transportation Plan)
  - allocates funds under its purview to transportation projects
  - programs transportation projects (via the Transportation Improvement Program) to improve the performance of the transportation network
- The HRTPO measures the performance of the transportation network to determine the impact of projects implemented in Step 2, and then repeats these three steps

MEASURING PERFORMANCE

HRTPO staff measures the performance of the regional transportation system in multiple ways. As part of the Congestion Management Process, HRTPO staff annually updates and publishes the *State of Transportation in Hampton Roads* report. This report details the current status and historical trends of all facets of the transportation system in Hampton Roads, and includes comparisons with similar metropolitan areas in the United States.

In addition to the *State of Transportation in Hampton Roads* report, the HRTPO prepares a standard set of regional performance measures based on federal legislation. These federally established performance measures, which are tied to the national performance goals, are shown on the next page.

For Roadway Safety and Transit Asset Management, targets are established for a one-year time horizon and must be set on an annual basis. For Bridge Condition, Pavement Condition, Roadway Performance and Freight Measures, MPO targets are established for a four-year time horizon. The current regional targets (as of 2020) established by the HRTPO Board are shown on the next page.

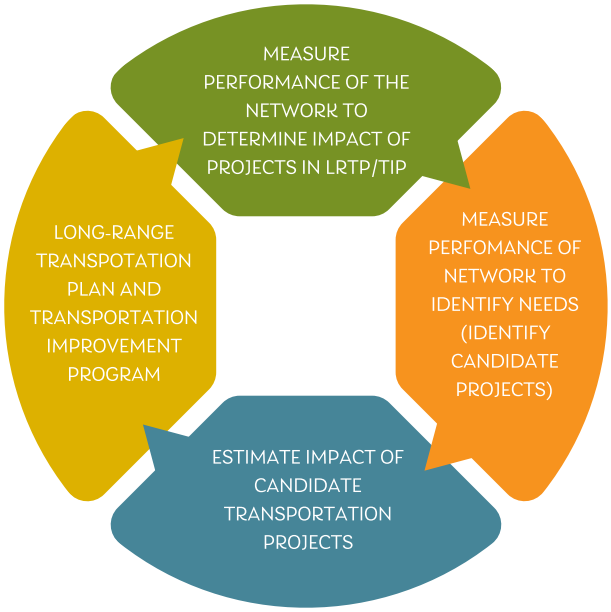


Figure 49: Performance Management Process

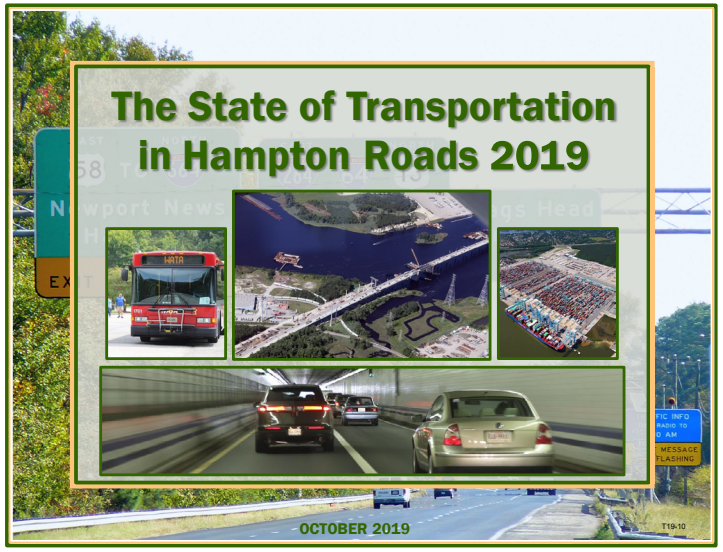


Table 3: Annual Targets (2020) - Roadway Safety

AREA	MEASURES	TARGET
ROADWAY SAFETY	Fatalities	124
	Fatality Rate	0.84
	Serious Injuries	1,448
	Serious Injury Rate	9.85
	Bike/Pedestrian Fatalities & Serious Injuries	163

Table 4: Annual Targets (2020) - Transit Asset Management

ASSET TYPE	PERFORMANCE MEASURE	ASSET CLASSES	TARGET
ROLLING STOCK	% OF REVENUE VEHICLES WITHIN EACH ASSET CLASS THAT HAVE MET OR EXCEEDED THEIR USEFUL LIFE BENCHMARK	Buses	<19%
		Cutaway Buses	<1%
		Ferry Boats	<33%
		Light Rail Vehicles	0%
		Minibus	<20%
		Trolley Buses	<3%
		Vans	<25%
EQUIPMENT/SERVICE VEHICLES	% OF VEHICLES THAT HAVE MET OR EXCEEDED THEIR USEFUL LIFE BENCHMARK	Non-Revenue Vehicles	<66%
		Truck/Rubber Tire Vehicles	<13%
INFRASTRUCTURE	% OF TRACK SEGMENTS, SIGNALS, AND SYSTEMS WITH PERFORMANCE RESTRICTIONS	Light Rail	<1%
FACILITIES	% OF FACILITIES IN EACH ASSET CLASS RATED UNDER 3.0 ON FTA'S TERM SCALE	Passenger/Parking	<1%
		Maintenance	<10%
		Adminstrative	<10%

Table 5: 4-Year Targets (2021)

AREA	MEASURES	TARGET
PAVEMENT CONDITION	% Interstate System pavement in good condition	>45%
	% Interstate System pavement in poor condition	<3%
	% Non-Interstate System NHS pavement in good condition	>25%
	% Non-Interstate System NHS pavement in poor condition	<5%
BRIDGE CONDITION	% NHS bridge deck area in good condition	>20%
	% NHS bridge deck in poor condition	<3%
ROADWAY PERFORMANCE	Interstate Travel Time Reliability	<1%
	Non-Interstate NHS Travel Time Reliability	<33%
FREIGHT	Truck Travel Time Reliability	0%
CMAQ	N/A for Attainment Areas	<20%

Source: HRTPO

Setting the initial and subsequent HRTPO targets was a collaborative effort. The Transportation Technical Advisory Committee (TTAC) recommended targets for the HRTPO Board to consider and establish for the region based on advice from the Performance Measures Working Group.

HRTPO staff prepares a *System Performance Report* annually on the regional performance measures and targets. This report includes a description of the methodology used to calculate each measure, historical data trends for each of the areas, information on statewide targets, a description of the targets established by the HRTPO Board, and the progress being made towards meeting the established targets.

INCORPORATING TARGETS INTO THE PLANNING PROCESS

MAP-21 and the FAST Act also require that MPOs include these performance measures and targets, and report on progress in planning documents such as the LRTP and Transportation Improvement Program (TIP).

Per Federal guidelines, the LRTP is required to include a description of the federally mandated performance measures and targets used in assessing the performance of the transportation system. The LRTP shall also include a system performance report evaluating the condition and performance of the transportation system including progress achieved by the MPO towards meeting the performance targets. The annual System Performance Report was created to satisfy this requirement. Also, MPOs that elect to conduct scenario planning (as HRTPO has for the 2045 LRTP) shall describe how the preferred scenario will improve performance of the system.

TIPs are federally mandated, regional documents that identify the programming of transportation funds over a four-year period. It lists all projects for which federal funds are anticipated, along with non-federally funded projects that are determined to be regionally significant. For performance measures and targets, TIPs shall include a description of the anticipated effect of the TIP toward achieving the performance targets identified by the MPO. The TIP must also link investment priorities to the achievement of performance targets in the plans.

TIPs and LRTPs must include this information when any updates or amendments are made two years from the effective date of each rule establishing performance measures. For safety measures, this information had to be included in the TIP and LRTP for all updates and amendments after May 27, 2018. For Transit Asset Management measures the inclusion date was October 1, 2018, and for the remaining measures the inclusion date was May 20, 2019.

The HRTPO TIP has been updated to include information on the program's impact on each of these areas. Updates were made in May 2018 for roadway safety, October 2018 for Transit Asset Management, May 2019 for all the other target areas, and February 2020 for updates to safety and transit. The LRTP was updated via an administrative modification for the roadway safety measures in May 2018, Transit Asset Management in October 2018, and the remaining categories in March 2020. Both the TIP and LRTP will be updated as necessary to account for updates to regional measures and targets.

In addition, the metropolitan transportation planning agreement between the MPO, the State, and regional public transportation providers (commonly referred to as the 3-C agreement) was updated in September 2018 to include an article on Performance-Based Metropolitan Planning Process responsibilities. The updated agreement – which details each party's responsibilities in terms of performance-based planning – is available at https://www.hrtpo.org/page/metropolitan-planning-agreement.

More information on the HRTPO Performance Management effort is available at http://hrtpo.org/page/performance-management.

APPENDIX A

Letters and materials sent to Environmental Agencies and Stakeholders as part of the consultation on the development of the 2045 Long-Range Transportation Plan and for feedback on the environmental discussion based on the agency's respective area of expertise.

Response from the National Park Service included.

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TRANSPORTATION PLANNING ORGANIZATION

John L. Rowe, Jr, Chair, Donnie R. Tuck, Vice-Chair
Robert A. Crum, Jr., Executive Director

April 29, 2020

Memorandum #2020-48

TO: **Craig Nicol, VDEQ**
Tony Watkinson, VMRC
Michael Phillips, VCC
Lynn Crump, VDCR
Dave Slack, VDOF
Julie Langan, VDHR
Gray Anderson, VDGIF

BY: **Dale M. Stith, Principal Transportation Planner**

RE: **Hampton Roads 2045 Long-Range Transportation Plan**

The Hampton Roads Transportation Planning Organization (HRTPO) is currently developing the region's 2045 fiscally-constrained Long-Range Transportation Plan (LRTP). The final list of projects selected by the HRTPO Board for inclusion in the fiscally-constrained LRTP will be completed by June 2021. As a part of this process, we are requesting your comments in two areas: development of the Long-Range Transportation Plan, and inclusion of an environmental mitigation discussion.

Development of Long-Range Transportation Plan

As part of the evaluation of candidate projects for the 2045 LRTP, the HRTPO is required to consult with State and local agencies, per Federal regulations:

> *"In each metropolitan area, the metropolitan planning organization shall consult, as appropriate, with State and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning the development of a long-range transportation plan.*
>
> *The consultation shall involve, as appropriate—*
> *(i) comparison of transportation plans with State conservation plans or maps, if available; or*
> *(ii) comparison of transportation plans to inventories of natural or historic resources, if available."* (Title 23 of the United States Code, Section 134(i)(5)(A))

Enclosed are tables and maps of transportation projects which are candidates for inclusion in the 2045 LRTP. An online version of the projects can also be found at: https://hrpdc-gis.maps.arcgis.com/apps/MapSeries/index.html?appid=b8852614e73a42bfa3730963d216f2ab. Upon request, HRTPO staff can also provide GIS data as well as maps of spatial overlay analysis conducted as part of our candidate project evaluation process.

Environmental Mitigation Discussion

We are also seeking comments on the enclosed draft discussion with regard to your particular area of expertise, per Federal regulations:

> *"A long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan. The discussion shall be developed in consultation with Federal, State, Tribal, wildlife, land management, and regulatory agencies."* (Title 23 of the United States Code, Section 134(i)(2)(D))

Contact information

Your assistance with this is greatly appreciated. Please provide your comments with respect to your area of expertise to us by **May 22, 2020**. My contact information is:

Dale M. Stith, AICP, GISP
Principal Transportation Planner
Hampton Roads Transportation Planning Organization
723 Woodlake Drive
Chesapeake, VA 23320
dstith@hrtrpo.org
phone: (757) 420-8300
fax: (757) 523-4881

DS/cm

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TRANSPORTATION PLANNING ORGANIZATION

April 29, 2020

Memorandum #2020-49

TO: **Chief Mark Custalow, Mattaponi Indian Tribe**
Chief Robert Gray, Pamunkey Indian Tribe
Chief Stephen Adkins, Chickahominy Indian Tribe
Chief Gerald Stewart, Chickahominy Indian Tribe, Eastern Division
Chief G. Anne Richardson, Rappahannock Tribe
Chief W. Frank Adams, Upper Mattaponi Indian Tribe
Chief Sam Bass, Nansemond Indian Nation
Chief Dennis Dean Branham, Monacan Indian Nation
Chief Walt "Red Hawk" Brown, Cheroenhaka (Nottoway) Indian Tribe
Chief Lynette Allston, Nottoway Indian Tribe
Chief Charles "Bootsie" Bullock, Patawomeck Indian Tribe

BY: **Dale M. Stith, Principal Transportation Planner**

RE: **Hampton Roads 2045 Long-Range Transportation Plan**

The Hampton Roads Transportation Planning Organization (HRTPO) is currently developing the region's 2045 fiscally-constrained Long-Range Transportation Plan (LRTP). The final list of projects selected by the HRTPO Board for inclusion in the fiscally-constrained LRTP will be completed by June 2021. As a part of this process, we are requesting your comments in two areas: development of the Long-Range Transportation Plan, and inclusion of an environmental mitigation discussion.

In addition, to ensure proper distribution of this review and request for comments, the HRTPO is seeking assistance in distributing the attached letter and materials to the tribal stakeholders that your organization represents within the greater Hampton Roads region.

<u>Development of Long-Range Transportation Plan</u>

As part of the evaluation of candidate projects for the 2045 LRTP, the HRTPO is required to consult with State and local agencies, per Federal regulations:

> *"In each metropolitan area, the metropolitan planning organization shall consult, as appropriate, with State and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning the development of a long-range transportation plan.*

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The consultation shall involve, as appropriate—
(i) comparison of transportation plans with State conservation plans or maps, if available; or
(ii) comparison of transportation plans to inventories of natural or historic resources, if available." (Title 23 of the United States Code, Section 134(i)(5)(A))

Enclosed are tables and maps of transportation projects which are candidates for inclusion in the 2045 LRTP. An online version of the projects can also be found at: https://hrpdc-gis.maps.arcgis.com/apps/MapSeries/index.html?appid=b8852614e73a42bfa3730963d216f2ab. Upon request, HRTPO staff can also provide GIS data as well as maps of spatial overlay analysis conducted as part of our candidate project evaluation process.

Environmental Mitigation Discussion

We are also seeking comments on the enclosed draft discussion with regard to your particular area of expertise, per Federal regulations:

"A long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan. The discussion shall be developed in consultation with Federal, State, Tribal, wildlife, land management, and regulatory agencies." (Title 23 of the United States Code, Section 134(i)(2)(D))

Contact information

Your assistance with this is greatly appreciated. Please provide your comments with respect to your area of expertise to us by **May 22, 2020**.

If you have additional questions or concerns, my contact information is:

Dale M. Stith, AICP, GISP
Principal Transportation Planner
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TRANSPORTATION PLANNING ORGANIZATION

April 29, 2020

Memorandum #2020-47

TO: **Diana Esher, USEPA**
Patrick Kinsman, USACE
Gay Vietzke, NPS
Susan Lingenfelser, USFWS
Mike Tupper, USGS
Monique Evans, FHWA
Elizabeth Walker-Green, USDA
Terry Garcia-Crews, FTA
Ronald Batory, FRA

BY: **Dale M. Stith, Principal Transportation Planner**

RE: **Draft Environmental Mitigation Discussion**

The Hampton Roads Transportation Planning Organization (HRTPO) is currently preparing the region's 2045 fiscally-constrained Long-Range Transportation Plan. As part of this effort, we are seeking your comments on the enclosed draft discussion with regard to your particular area of expertise, per Federal regulations:

> *"A long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan. The discussion shall be developed in consultation with Federal, State, Tribal wildlife, land management, and regulatory agencies."* (Title 23 of the United States Code, Section 134(i)(2)(D))

Your assistance with this is greatly appreciated. Please provide your comments with respect to your area of expertise to us by **May 22, 2020**. My contact information is:

Dale M. Stith, AICP, GISP
Principal Transportation Planner
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phone: (757) 420-8300 | fax: (757) 523-4881

DS/cm

DRAFT Potential Environmental Mitigation Activities and Areas
Developed from VDOT Environmental Consultation Guidance
August 2014

Background
The following discussion and table are based on text developed by the Virginia Department of Transportation (VDOT) staff for use by Metropolitan Planning Organizations around the state. VDOT developed this generalized mitigation discussion text and table with preliminary review and input of senior staff in VDOT planning, environmental, and right-of-way divisions, and the Virginia Division of Federal Highway Administration (FHWA) planning office. The text and table were designed in consideration of the relevant metropolitan transportation planning provisions in 23USC134 as amended by MAP-21, as well as the FHWA and FTA June 2, 2014 Notice of Proposed Rulemaking for updating 23CFR450 to implement MAP-21.

Discussion
Metropolitan transportation planning is a regional process that is used to identify the transportation issues and needs in metropolitan areas. In metropolitan areas over 50,000 in population, the responsibility for transportation planning lies with designated Metropolitan Planning Organizations (MPO). This planning process is a collaborative effort between the member jurisdictions, the Virginia Department of Transportation, transit operators, and other modal representatives. During the plan development, the MPO examines land development patterns, demographics, travel patterns and trends to identify existing and future transportation problems. The MPO then identifies alternatives to meet current and projected future demands that will provide a safe and efficient transportation system that meets the needs of the traveling public while limiting adverse impacts to the environment.

The jurisdictions in the region work together to develop a financially constrained long-range transportation plan. The constrained long-range transportation plan (LRTP) for this region identifies and recommends a capital investment strategy to meet the existing and future transportation needs of the public over the next 20 years. The inclusion of a recommended improvement in the long-range transportation plan represents preliminary regional support for that improvement. The LRTP is a decision-making tool to determine which projects should be implemented. However, transportation improvements go through several steps from conception to implementation and take many years to successfully complete.

The considerations and recommendations made during the planning process are preliminary in nature. Detailed environmental analysis conducted through the National Environmental Policy Act (NEPA) does not apply to long-range transportation plans. With exceptions for regional ambient air quality, offsetting environmental impacts during the long-range planning process is not required. However, per Federal regulations (FASTAct), the inclusion of a discussion regarding potential environmental mitigation activities, areas to provide the mitigation, and activities that may have the greatest potential to restore and maintain the environment is required.

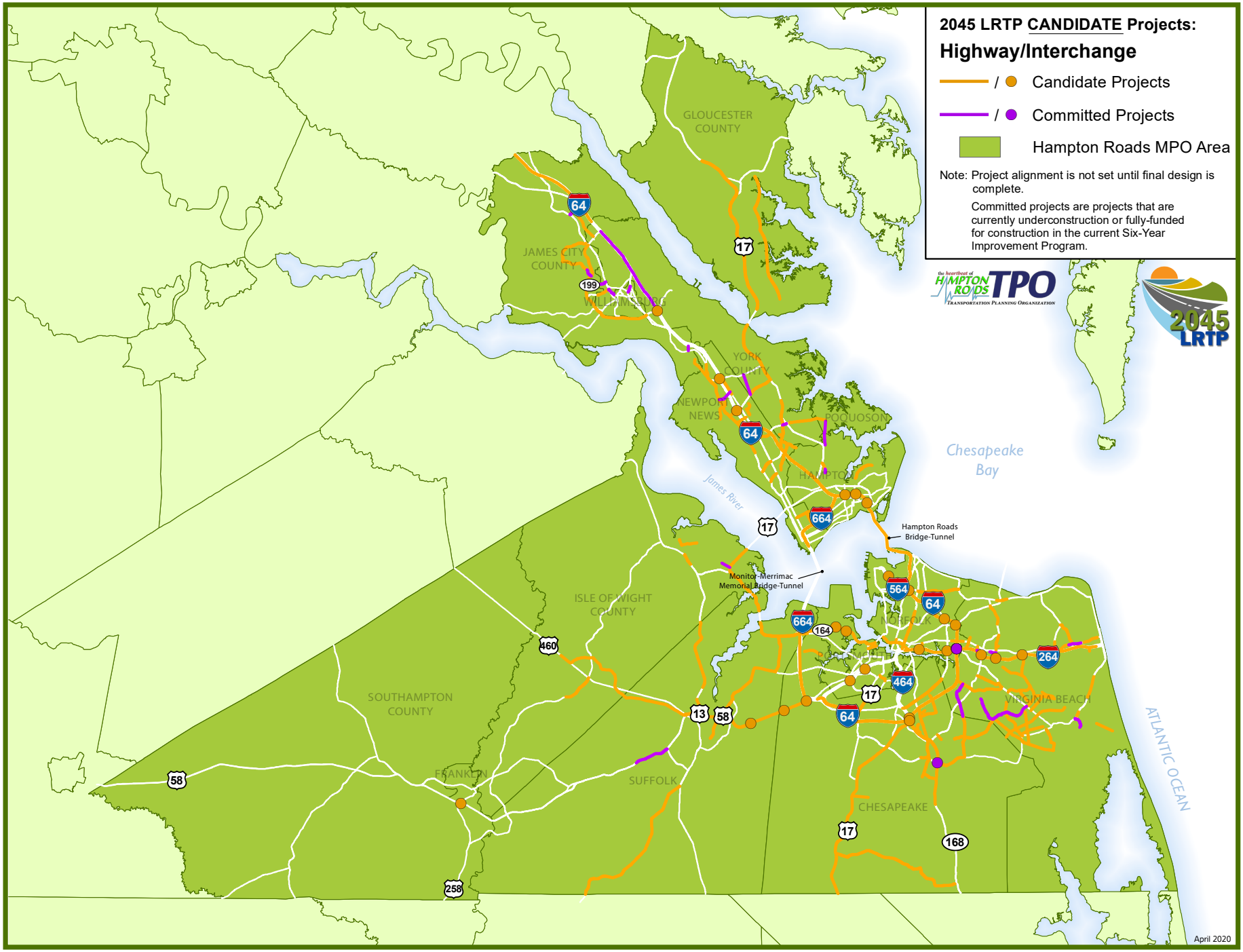
Detailed environmental analysis of individual transportation projects occurs later in the project development process as the improvement approaches the preliminary engineering stage. At this stage, project features may be narrowed and refined, and the environmental impacts and environmental mitigation strategies can be appropriately ascertained. Virginia's State Environmental Review Process directs the project-by-project interagency review, study and identification of environmental concerns. Related requirements that typically apply at this stage involve public hearings, environmental permit-processing, and NEPA studies. A variety of environmental documentation, permit and mitigation needs are usually identified and environmental findings are closely considered and evaluated. Common project environmental mitigation measures (required silt-fence barriers, precautions to control dust, etc) are managed using Road and Bridge Standards that apply to all construction activities. Special environmental concerns, however, may differ widely by project and location. As environmental studies are conducted and undergo public and interagency review, needed mitigation plans are specified and committed to within the environmental documents on the particular transportation project or activity. Environmental management systems are then used to monitor, and ensure compliance with, the environmental mitigation commitments.

Potential environmental mitigation activities may include: avoiding impacts altogether, minimizing a proposed activity/project size or its involvement, rectifying impacts (restoring temporary impacts), precautionary and/or abatement measures to reduce construction impacts, employing special features or operational management measures to reduce impacts, and/or compensating for environmental impacts by providing suitable, replacement or substitute environmental resources of equivalent or greater value, on or off-site. Where on-site mitigation areas are not reasonable or sufficient, relatively large off-site compensatory natural resource mitigation areas generally may be preferable, if available. These may offer greater mitigation potential with respect to planning, buffer protection and providing multiple environmental habitat value (example: wetland, plant and wildlife banks). Mitigation activities and the mitigation areas will be consistent with legal and regulatory requirements relating to the human and natural environment. These may pertain to neighborhoods and communities, homes and businesses, cultural resources, parks, and recreation areas, wetlands and other water sources, forested and other natural areas, agricultural areas, endangered and threatened species, and the ambient air. The following table illustrates some potential mitigation activities and potential mitigation areas for these resources.

DRAFT Table of Potential Resource Mitigation Activities and Areas

Resource	Key applicable requirements	Potential mitigation activities for project implementation	Potential mitigation areas for project implementation
Neighborhoods and communities, and homes and businesses	Uniform Relocation Assistance and Real Property Acquisition Policy Act at 42 USC 4601 et seq.	Impact avoidance or minimization; context sensitive solutions for communities (appropriate functional and/or aesthetic design features)	Mitigation on-site or in the general community. (Mitigation for homes and businesses is in accord with 49 CFR 24)
Cultural resources	National Historic Preservation Act at 16 USC 470	Avoidance, minimization; landscaping for historic properties; preservation in place or excavation for archaeological sites; Memoranda of Agreement with the Department of Historic Resources; design exceptions and variances; environmental compliance monitoring	On-site landscaping of historic properties, on-site mitigation of archeological sites; preservation in place
Parks and recreation areas	Section 4(f) of the U.S. Department of Transportation Act at 49 USC 303	Avoidance, minimization, mitigation; design exceptions and variances; environmental compliance monitoring	On site screening or on-site replacement of facilities; in some cases, replacement of affected property adjacent to existing
Wetlands and water resources	Clean Water Act at 33 USC 1251-1376; Rivers and Harbors Act at 33 USC 403	Mitigation sequencing requirements involving avoidance, minimization, compensation (could include preservation, creation, restoration, in-lieu fees, riparian buffers); design exceptions and variances; environmental compliance monitoring	Based on on-site/off-site and in-kind/out-of-kind sequencing requirements; private or publicly operated mitigation banks used in accordance with permit conditions
Forested and other natural areas	Agricultural and Forest District Act (Code of VA Sections 15.2-4305; 15.2-4307-4309; 15.2-4313); Open Space Land Act (Section 10.1-1700-1705, 1800-1804)	Avoidance, minimization; Replacement property for open space easements to be of equal fair market value and of equivalent usefulness; design exceptions and variances; environmental compliance monitoring	Landscaping within existing rights of way; replacement property for open space easements to be contiguous with easement; replacement of forestry operation within existing agriculture / forestal district
Agricultural areas	Farmland Protection Policy Act of 1981 at 7 USC 4201-4209, Agricultural and Forest District Act (Code of VA Sections 15.2-4305; 15.2-4307-4309; 15.2-4313)	Avoidance, minimization; design exceptions and variances; environmental compliance monitoring	Replacement of agricultural operation within existing agriculture / forestal district
Endangered and threatened species	Endangered Species Act at 16 USC 1531-1544	Avoidance, minimization; time of year restrictions; construction sequencing; design exceptions and variances; species research; species fact sheets; Memoranda of Agreements for species management; environmental compliance monitoring	Relocation of species to suitable habitat adjacent to project limits
Ambient air quality	Clean Air Act at 42 USC 7401-7671, and Conformity regulations at 40 CFR 93	Transportation control measures, transportation emission reduction measures	Within air quality non-attainment and maintenance areas

Source: Virginia Department of Transportation


2045 LRTP CANDIDATE Projects:
Highway/Interchange
Candidate Projects
Committed Projects
Hampton Roads MPO Area
Note: Project alignment is not set until final design is complete.
Committed projects are projects that are currently underconstruction or fully-funded for construction in the current Six-Year Improvement Program.
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Transportation Planning Organization
2045 LRTP
GLOUCESTER COUNTY
JAMES CITY COUNTY
WILLIAMSBURG
YORK COUNTY
NEWPORT NEWS
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HAMPTON
Chesapeake Bay
James River
Hampton Roads Bridge-Tunnel
Monitor-Merrimac Memorial Bridge-Tunnel
ISLE OF WIGHT COUNTY
SOUTHAMPTON COUNTY
FRANKLIN
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NORFOLK
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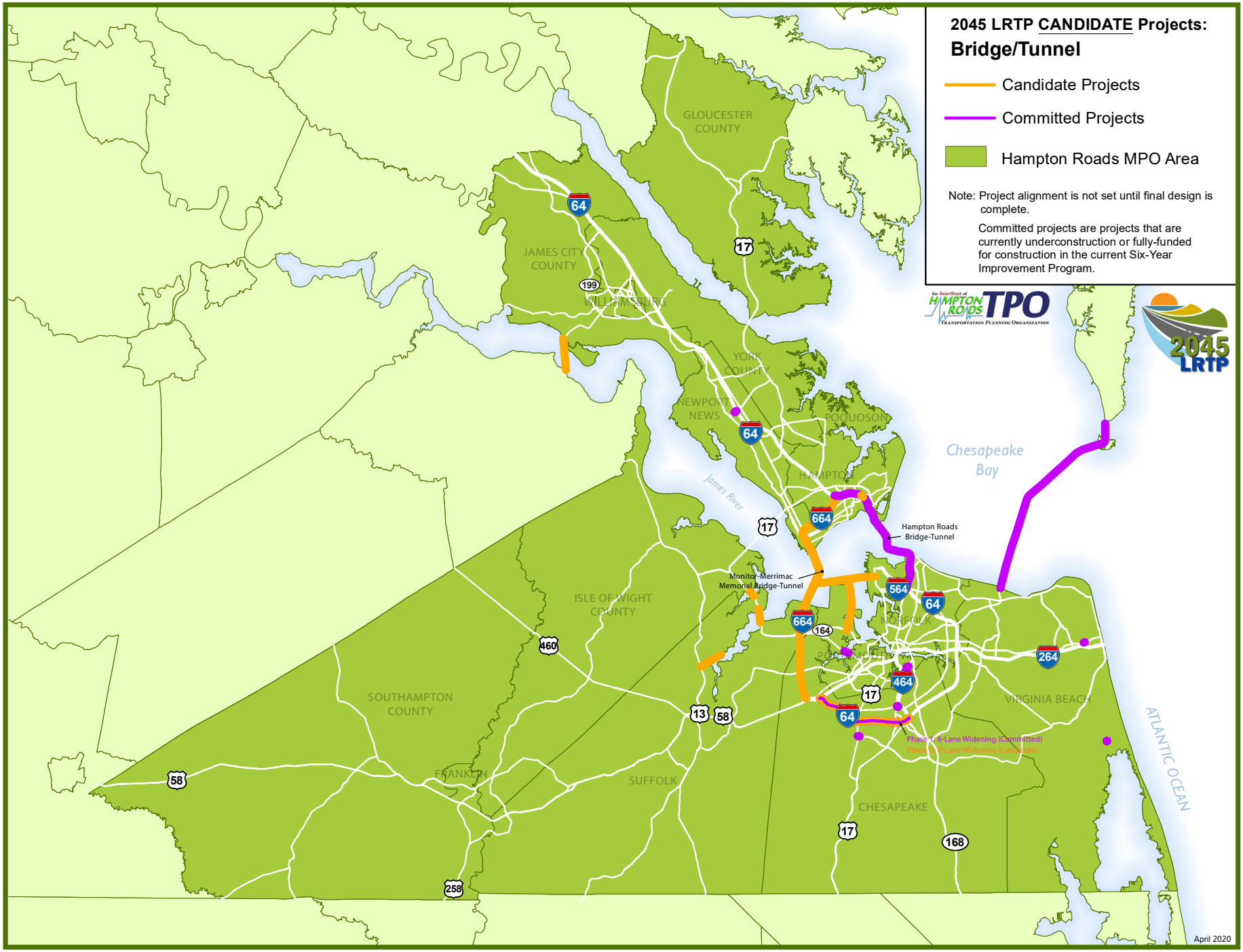
2045 LRTP CANDIDATE Projects:
Bridge/Tunnel
Candidate Projects
Committed Projects
Hampton Roads MPO Area
Note: Project alignment is not set until final design is complete.
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2045 LRTP
GLOUCESTER COUNTY
JAMES CITY COUNTY
WILLIAMSBURG
YORK COUNTY
NEWPORT NEWS
POQUOSON
HAMPTON
Chesapeake Bay
James River
Hampton Roads Bridge-Tunnel
Monitor-Merrimac Memorial Bridge-Tunnel
ISLE OF WIGHT COUNTY
SOUTHAMPTON COUNTY
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Phase II 8-Lane Widening (Candidate)
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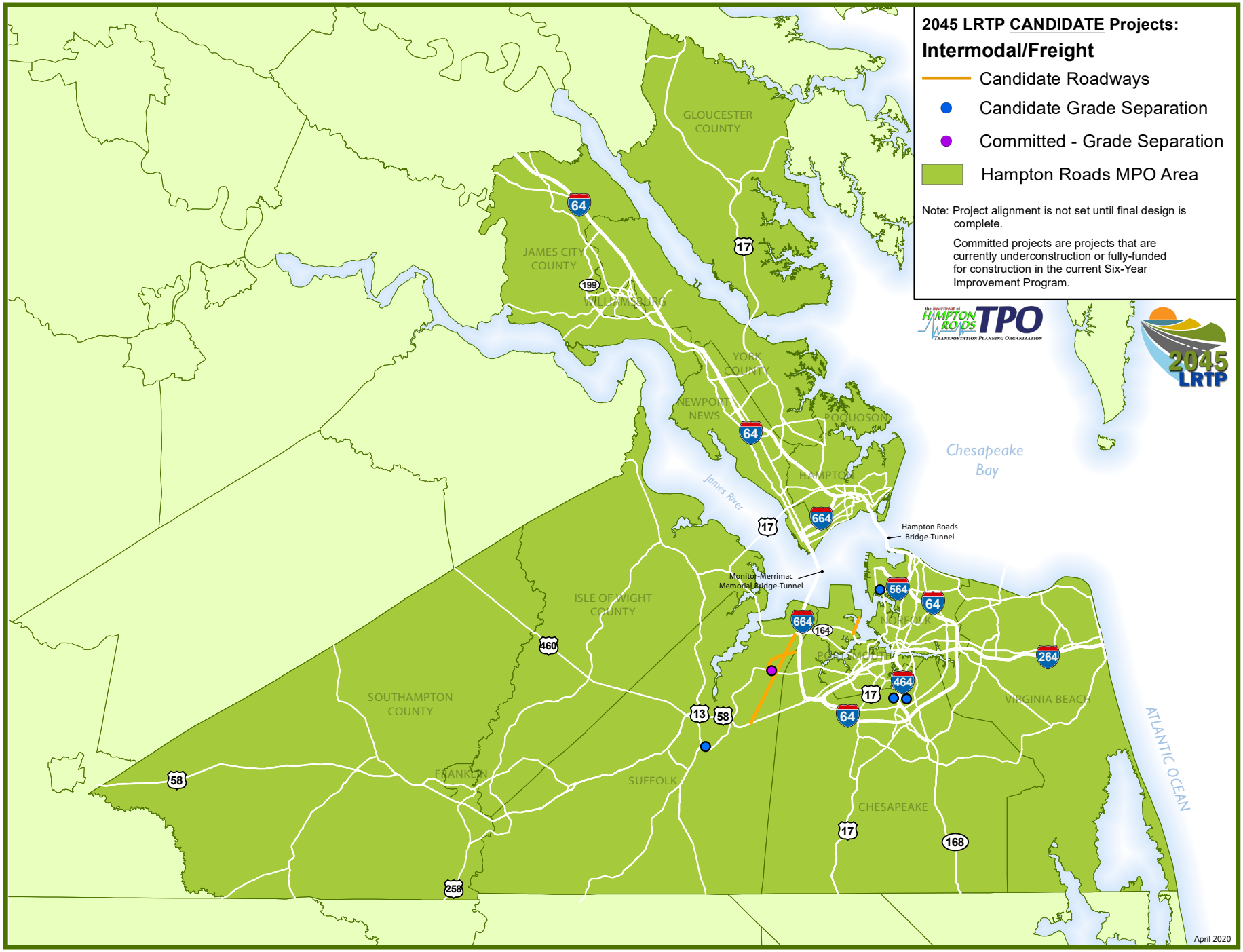
2045 LRTP CANDIDATE Projects:
Intermodal/Freight
Candidate Roadways
Candidate Grade Separation
Committed - Grade Separation
Hampton Roads MPO Area
Note: Project alignment is not set until final design is complete.
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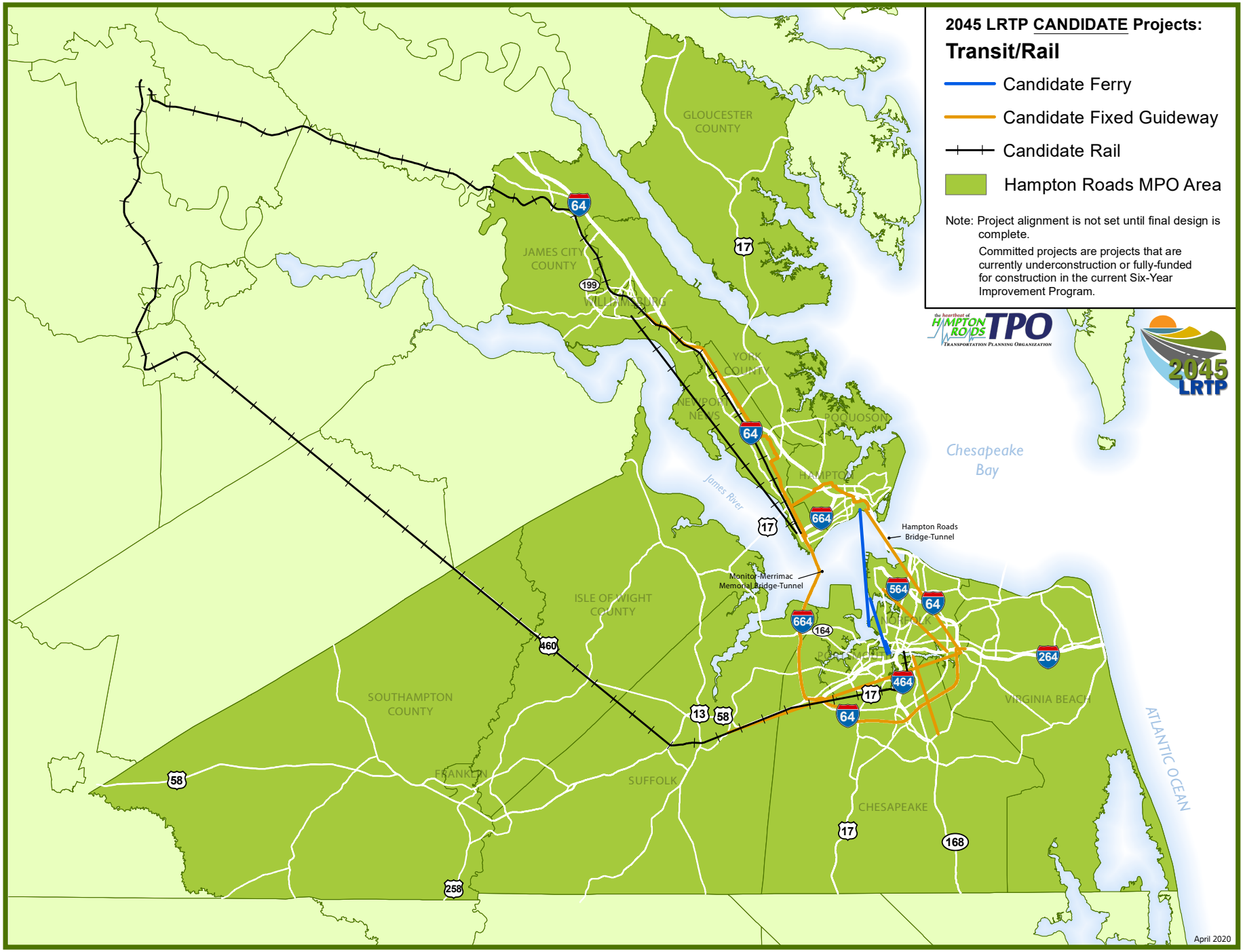
2045 LRTP CANDIDATE Projects:
Transit/Rail
Candidate Ferry
Candidate Fixed Guideway
Candidate Rail
Hampton Roads MPO Area
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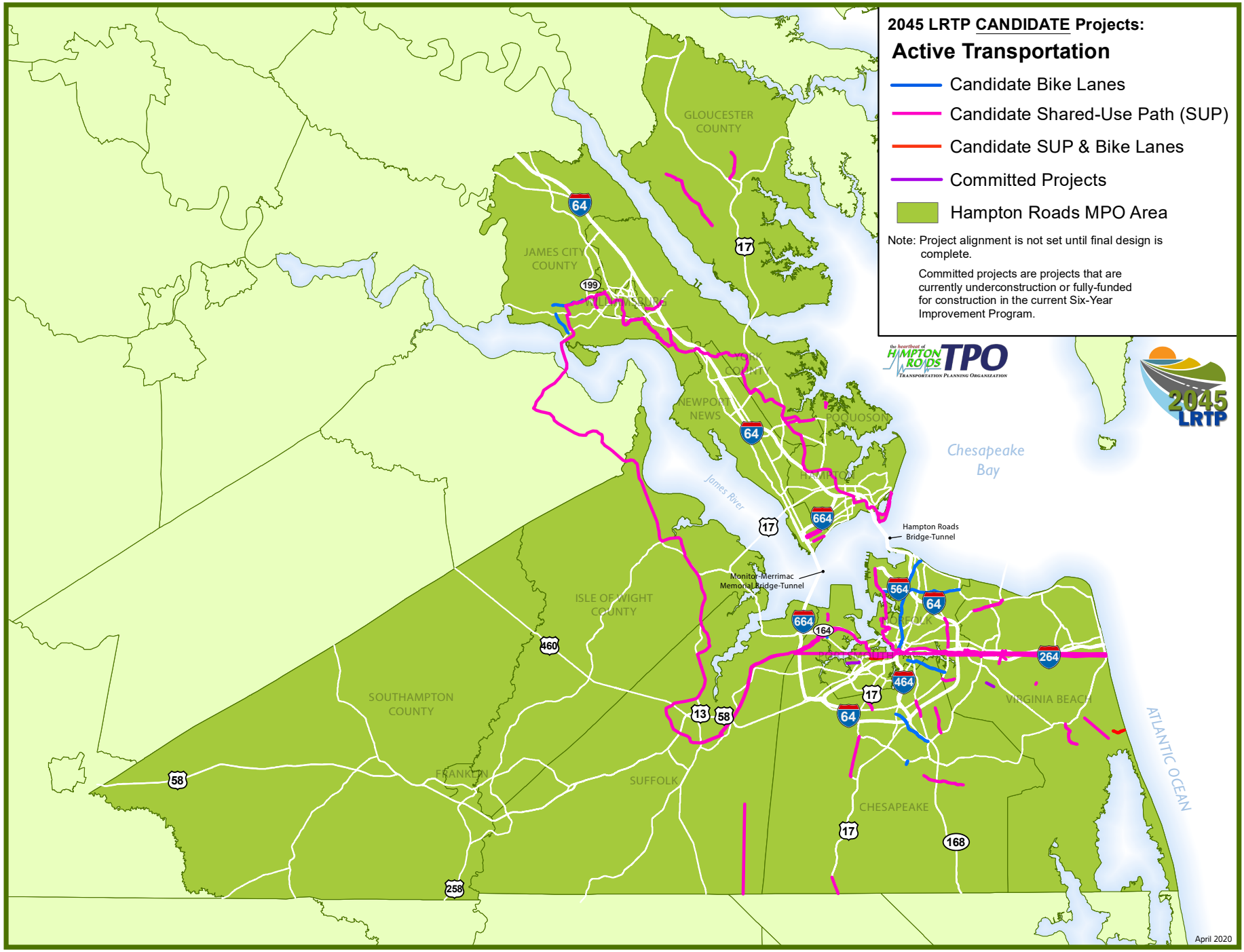
2045 LRTP CANDIDATE Projects:
Active Transportation
Candidate Bike Lanes
Candidate Shared-Use Path (SUP)
Candidate SUP & Bike Lanes
Committed Projects
Hampton Roads MPO Area
Note: Project alignment is not set until final design is complete.
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April 2020

Hampton Roads 2045 Long-Range Transportation Plan Candidate Projects

2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-401	Multi-jurisdictional	I-564/I-664 Connector and VA-164 Connector (Patriots Crossing portion and Craney Island Connector)	I-564/MMMBT	VA-164	Bridge/Tunnel	0	4	New facility.
2045-402	Multi-jurisdictional	I-664/MMMBT	Bowers Hill Interchange	Hampton Coliseum	Bridge/Tunnel	4	6/8 with EL	Widening from 4 lanes up to 8 lanes, with Express Lanes included as part of project (similar to HRTB and HRB configuration with GP lanes, 1 full time HOT, 1 part time HOT).
2045-403	Multi-jurisdictional	I-664/MMMBT	Terminal Ave	College Dr	Bridge/Tunnel	4	6/8	Widening from 4 lanes up to 8 lanes.
2045-404	Multi-jurisdictional	Upper James River Bridge	James City County/Lower Peninsula	Surry County/Southside	Bridge/Tunnel	0	4	New bridge crossing connecting James City County to Surry County. Include walkable/bikeable.
2045-405	Multi-jurisdictional	Sidney Bertram Hazelwood Sr. Bridge	N/A	N/A	Bridge/Tunnel	2	4	Widening from 2 to 4 lanes to address congestion.
2045-406	Multi-jurisdictional	I-64 Southside Widening Including High Rise Bridge Phase II	I-464	I-664	Bridge/Tunnel	6	8	Widen to 8 lanes.
2045-407	Hampton	I-64 Bridge over Hampton River - EB Only	I-664	Start of Future HOT Lanes	Bridge/Tunnel	6	TBD	Project part of proposed regional expansion of Express Lanes network.
2045-408	Suffolk	Kings Hwy Bridge	Godwin Blvd (Rte 10)	Kings Hwy	Bridge/Tunnel	0	2	Provides for new alignment for Kings Highway Bridge that was previously closed due to deteriorated condition associated with lack of maintenance by VDOT
2045-409	Suffolk	Mills Godwin Bridge	Quail Hollow	Waterview Rd	Bridge/Tunnel	2	4	Widening from 2 to 4 lanes to address congestion
2045-160	Multi-jurisdictional	I-64 Peninsula Widening Segment 4	1.15 miles west of Route 199, Lightfoot (Exit 234)	Hampton Roads MPA Boundary	Highway	4	6	Widening from 4 to 6 lanes.
2045-101	Multi-jurisdictional	Denbigh Blvd (Rte 173)	Newport News CL	G.W. Mem Hwy (US 17)	Highway	2	4	Widening
2045-103	Multi-jurisdictional	Godwin Blvd - Phase 2	Village of Chuckatuck	Isle of Wight CL	Highway	2	4	Widening from 2 to 4 lanes to address congestion.
2045-104	Multi-jurisdictional	I-264 Widening	Norfolk	Virginia Beach	Highway	8	10 or 12	Widen and reconfigure I-264 from 8 lanes to 10 lanes or 12 lanes (combination of General Purpose lanes and HOV/HOT lanes). Provide interchange improvements at every interchange.
2045-105	Multi-jurisdictional	I-64 Express Lanes - Segment II	I-264	I-464	Highway	2	2	Conversion of I-64 High-Occupancy-Vehicle (HOV-2) lanes to High-Occupancy-Toll (HOT) or Express Lanes from I-264 Interchange to I-464
2045-108	Multi-jurisdictional	I-64 Express Lanes Network	Jefferson Ave	Bowers Hill Interchange or I-664	Highway	TBD	TBD	Expand region's Express Lane network.
2045-108A	Multi-jurisdictional	I-64 Express Lanes Network - Segment 4	Jefferson Ave	Settlers Landing Rd	Highway	2	2	Convert HOV to HOT on Peninsula
2045-108B	Multi-jurisdictional	I-64 Express Lanes Network - PT Shoulders along Segment 1	I-564	I-264	Highway	0	2	Part-shoulders along exisiting reversible section of Express Lanes (Segment 1)
2045-109	Multi-jurisdictional	I-664 Widening	Bowers Hill	College Dr	Highway	4/6	6	Widening to 6 lanes.
2045-110	Multi-jurisdictional	I-664 Widening	Hampton Coliseum	Terminal Ave	Highway	6	8	Widen I-664 from six lanes to eight lanes from Hampton Coliseum to Terminal Ave for additional capacity and congestion relief.

Hampton Roads 2045 Long-Range Transportation Plan Candidate Projects

2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-111	Multi-jurisdictional	Mooretown Rd Extension	Lightfoot Rd	Croaker Rd	Highway	2	4	Extension of Mooretown Road from Lightfoot Road to Croaker Road. Project will relieve congestion on Route 60, provide access to the County's Economic Opportunity Zone, reduce or eliminate the use of several hazardous rail crossings, and provide an additional access route from I-64 during emergency situations.
2045-112	Multi-jurisdictional	Newtown Road	Baker Rd	Virginia Beach Blvd	Highway	4	6	Relieve congestion on parallel facilty
2045-113	Multi-jurisdictional	Route 199	Richmond Rd (US 60)	Pocahontas Trail/John Tyler Highway (Rte 5)	Highway	4	6	Congestion relief.
2045-116	Multi-jurisdictional	US 460/58/13 Connector	Bowers Hill Interchange	Eastern end of Suffolk Bypass	Highway	6	6	Safety improvements along corridor, including potential interchange at regional landfill
2045-117	Multi-jurisdictional	US Route 460	Suffolk Bypass	West of Zuni	Highway	0	4	Build new 4-lane divided highway.
2045-118	Multi-jurisdictional	US Route 60	James City County Line	Green Mount Pkwy	Highway	2	4	Congestion relief for Route 60. Also provides enhanced access for truck traffic and cargo between Route 60, I- 64 and Route 143 and promotes industrial development in the Skiffe's Creek industrial area.
2045-119	Multi-jurisdictional	VA-164 Widening	Pinners Point or APM Interchange	I-664	Highway	4	6	TBD
2045-120	Multi-jurisdictional	Victory Blvd (Rte 171)	Poquoson CL	Hampton Hwy (Rte 134)	Highway	2	4	Widening.
2045-121	Multi-jurisdictional	Victory Blvd (Rte 171)	Wythe Creek Rd (Rte 172)	York County CL	Highway	2	4	Widening.
2045-122	Chesapeake	Battlefield Blvd	Johnstown Rd	I-64	Highway	4/6	6/8	Widening
2045-123	Chesapeake	Ballahack Rd	G.W. Hwy (US 17)	Old Battlefield Blvd	Highway	2	4	Road widening, curve realignments, and ditch and shoulder improvements
2045-124	Chesapeake	Bruce Rd	Tyre Neck Rd	Taylor Rd	Highway	2	4	Widening Bruce Rd along existing alignment from 2 to 4 lanes from Tyre Neck Rd to Taylor Rd to include bike/ped facilities.
2045-125	Chesapeake	Cedar Rd	Holt Dr	Battlefield Blvd	Highway	2	4	Widening Cedar Rd along existing alignment from 2 to 4 lanes from Holt Dr to Battlefield Blvd to include bike/ped facilities.
2045-126	Chesapeake	Centerville Tnpk	Mount Pleasant Rd	Virginia Beach CL	Highway	2	6	Widen to 6-lane divided and replace Centerville Bridge
2045-127	Chesapeake	Centerville Tnpk - Phase 1	Mt Pleasant Rd	Elbow Rd	Highway	2	6	Widening of Centerville Tnpk along existing alignment from 2 to 6 lanes from Mt Plesant Rd to Elbow Rd to include bike/ped facilities. Replacement of existing bridge.
2045-128	Chesapeake	Centerville Tnpk - Phase 2	Elbow Rd	Virginia Beach CL	Highway	2	4	Widening of Centerville Tnpk along existing alignment from 2 to 4 lanes from Elbow Rd Virginia Beach CL to include bike/ped facilities.
2045-129	Chesapeake	Chesapeake Expressway Widening	I-64	Hillcrest Pkwy	Highway	4	6/8	Widen VA-168 to 8-lanes between I-64 and Mt. Pleasant Rd (Exit 11), building a parallel 4-lane bridge over the Intracoastal, then to 6-lanes between Mt. Pleasant Rd and Hillcrest Pkwy (Exit 8). Pay off the remaining debt for the VA-168 toll portion, and open it up as a free highway, relieving significant congestion on parallel Battlefield Blvd.
2045-130	Chesapeake	Chesapeake Regional Airport Access Rd	West Rd	G.W. Hwy (US 17)	Highway	0	4	Provide new, direct access to Chesapeake Airport from Dominion Blvd.
2045-131	Chesapeake	Eden Way Extended	Eden Way North	Sam's Circle	Highway	0	4	4-lane arterial connection on new alignment from Eden Way North to Sam's Circle to include bike/ped facilities.

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2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-132	Chesapeake	Elbow Rd	Butts Station Rd	Virginia Beach CL	Highway	2	4	roadway safety improvements to include realignment of curve sections and widen existing road to 4-lane divided
2045-133	Chesapeake	Elbow Rd - Phase 1 West - existing alignment	Centerville Tnpk	Virginia Beach CL	Highway	2	4	Widening of Elbow Rd along existing alignment from 2 to 4 lanes from Centerville Tnpk to Virginia Beach CL to include bike/ped facilities. Right of Way being purchased in advance.
2045-134	Chesapeake	Elbow Rd - Phase 2 East - existing alignment	Butts Station Rd	Centerville Rd	Highway	2	4	Widening of Elbow Rd along existing alignment from 2 to 4 lanes from Butts Station Rd to Centerville Rd to include bike/ped facilities. Right of Way being purchased in advance.
2045-135	Chesapeake	G.W. Hwy (US 17)	Yadkin Rd	Canal Dr	Highway	2	4	Relieve congestion with 2 additional travel lanes and improve pedestrian accomodations.
2045-136	Chesapeake	Green Tree Rd Extension	Kempsville Rd	Clearfield Ave	Highway	0	4	4-lane arterial extension of Green Tree Rd on new alignment from Kempsville Rd to Clearfield Ave to include bike/ped facilities.
2045-137	Chesapeake	Greenbrier Pkwy	Volvo Pkwy	Woodlake Dr	Highway	6	8	Widening from 6 lanes to 8 lanes.
2045-138	Chesapeake	Hanbury Rd	Johnstown Rd	Battlefield Blvd	Highway	2	4	Widening of Hanbury Rd along existing alignment from 2 to 4 lanes from Johnstown Rd to Battlefield Blvd to include bike/ped facilities.
2045-139	Chesapeake	I-664 Widening	Bowers Hill	Portsmouth Blvd	Highway	4	TBD	Widening of I-664 from Bowers Hill to Portsmouth Blvd in conjuction with VDOT Bowers Hill Intersection improvements.
2045-140	Chesapeake	I-87	Chesapeake Expressway	North Carolina Border	Highway	4	4	Bring Dominion Blvd to interstate standards.
2045-141	Chesapeake	Johnstown Rd - Phase 1	Battlefield Blvd	Parker Rd	Highway	2	4	Widening Johnstown Rd along existing alignment from 2 to 4 lanes from Battlefield Blvd to Parker Rd to include bike/ped facilities.
2045-142	Chesapeake	Johnstown Rd - Phase 2	Parker Rd	Hanbury Rd	Highway	2	4	Widening Johnstown Rd along existing alignment from 2 to 4 lanes from Parker Rd to Hanbury Rd to include bike/ped facilities.
2045-143	Chesapeake	Johnstown Rd - Phase 3	Hanbury Rd	Waters Rd	Highway	2	4	Widening Johnstown Rd along existing alignment from 2 to 4 lanes from Hanbury Rd to Waters Rd to include bike/ped facilities.
2045-144	Chesapeake	Military Hwy	Allison Dr	Virginia Beach CL	Highway	4	6	Relieve congestion w/ 2 additional travel lanes & improve pedestrian accommodations
2045-145	Chesapeake	Military Hwy	Campostella Rd	Battlefield Blvd	Highway	4	8	Widening
2045-146	Chesapeake	Military Hwy	Virginia Beach CL	I-464	Highway	4	8	Widening of Military Hwy to an 8-lane arterial from Providence to I-464 to include bike/ped facilities.
2045-147	Chesapeake	Mt Pleasant Rd, Phase 1	Chesapeake Expressway	Etheridge Rd	Highway	2	4 or 6	Relieve congestion w/ 2 additional travel lanes & improve pedestrian accommodations.
2045-148	Chesapeake	Mt Pleasant Rd, Phase 2	Etheridge Rd	Centerville Tnpk	Highway	2	4 or 6	Widening of Mt Pleasant Rd along existing alignment from 2 to 4 lanes from Centerville Tnpk to Etheridge Rd to include bike/ped facilities.
2045-149	Chesapeake	Volvo Pkwy Extended	Volvo Pkwy	Medical Pkwy	Highway	0	4	4-lane arterial connection on new alignment from Volvo Pkwy to Medical Pkwy to include bike/ped facilities.
2045-150	Chesapeake	Volvo Pkwy Widening	Battlefield Blvd	Greenbrier Pkwy	Highway	4	6	Widening of Volvo Pkwy to 6 lanes from Battlefield Blvd to Greenbrier Pkwy to include bike/ped facilities.

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2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-151	Gloucester	G.W. Mem Hwy (US 17)	1 mi North of Coleman Bridge	Main St (@ Walmart)	Highway	4	6	Widen from 4-lane urban and rural principal arterial to 6-lane urban and rural principal arterial.
2045-152	Gloucester	G.W. Mem Hwy (US 17)	Main St (@ Walmart)	Ark Rd	Highway	4	6	Congestion Relief, widening, safety improvement
2045-153	Gloucester	Proposed parallel facility for Route 17	TBD	TBD	Highway	TBD	TBD	Provide another main highway in Gloucester County.
2045-154	Hampton	Coliseum Dr Extension B	Butler Farm Rd	N. Campus Pkwy/ Magruder Blvd Intersection	Highway	0	4	New Facility
2045-155	Hampton	Little Back River Rd	N. King St	Harris Creek Rd	Highway	2	4	Widen to 4-lane divided with bike and ped accommodation
2045-157	Isle of Wight County	US 17/Carrollton Blvd (part of Route 17 corridor)	End of Chuckatuck Creek Bridge	James River Bridge	Highway	4	6	Widening
2045-158	Isle of Wight County	US 258	US 460	Sunset Dr	Highway	2	4	Widen 2-lane undivided road to divided 4-lane that connects intermodal park with US 460
2045-161	James City County	Longhill Rd (Phase 2)	Olde Towne Rd	Warhill Trail	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-162	James City County	Longhill Rd (Phase 3)	Warhill Trail	Centerville Rd	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-163	Newport News	Bland Blvd Widening	Jefferson Ave	Warwick Blvd	Highway	4	6	Widen the roadway including the I-64 and CSX overpass.
2045-164	Newport News	Briarfield Rd	Jefferson Ave	Hampton CL	Highway	2	4	Widening
2045-165	Newport News	Chestnut Ave	I-664	Briarfield Rd	Highway	2	4	Widening
2045-166	Newport News	Denbigh Blvd Widening Phase I	Warwick Blvd	CSX Overpass West Abuttment	Highway	4	6	Install a third through lane eastbound and westbound from Warwick Blvd to the CSX railroad overpass for additional capacity.
2045-167	Newport News	Denbigh Blvd Widening Phase II	CSX Overpass East Abuttment	Jefferson Ave	Highway	4	6	Install a third through lane eastbound and westbound from the CSX railroad overpass to Jefferson Ave for additional capacity.
2045-168	Newport News	Harpersville Rd Widening	Jefferson Ave	Warwick Blvd	Highway	2	4	Widen Harpersville Rd from Jefferson Ave to Warwick Blvd for additional capacity. Includes new CSX Overpass
2045-169	Newport News	Harpersville Rd Widening	J Clyde Morris Blvd	Saunders Rd	Highway	2	4	Widen Harpersville Rd from J. Clyde Morris Blvd to Saunders Rd for additional capacity and congestion relief during PM peak.
2045-269	Newport News	Harpersville Rd Widening	Saunders Rd	Hampton Roads Center Pkwy	Highway	2	4	Widen Harpersville Rd for additional capacity and congestion relief during PM peak. Includes I-64 overpass work
2045-170	Newport News	J. Clyde Morris Blvd Widening	Jefferson Ave	Warwick Blvd	Highway	4	6	Widening. Includes CSX Overpass work.
2045-171	Newport News	J. Clyde Morris Blvd / G.W. Hwy (US 17) Widening	I-64	York CL	Highway	4	6	Improves interstate access on Route 17 from York County

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2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-173	Newport News	Jefferson Ave Widening Phase I	Green Grove Ln	Industrial Park Dr	Highway	4	6	Install a third through lane northbound and southbound on Jefferson Ave from Green Grove RoadLn to Industrial Park Dr for additional capacity.
2045-174	Newport News	Jefferson Ave Widening Phase II	Industrial Park Dr	Fort Eustis Blvd	Highway	4	6	Install a third through lane northbound and southbound on Jefferson Ave from Industrial Park Dr to Fort Eustis Blvd for additional capacity.
2045-175	Newport News	Liberty Pkwy Extension	Oyster Point Rd	Freedom Way	Highway	0	2	Install a new roadway from Freedom Way to Oyster Point Rd to relieve congestion at the intersection of Jefferson Ave and Oyster Point Rd.
2045-176	Newport News	Lucas Creek Rd Extension	Denbigh Blvd (Rte 173)	Atkinson Blvd	Highway	0	4	Relieves congestion on parallel facility. Includes bridge.
2045-178	Newport News	Oyster Point Rd Widening	Jefferson Ave	I-64	Highway	6	8	Widening from 6 to 8 lanes. Includes interchange work.
2045-179	Newport News	Oyster Point Rd Widening Phase I	Operations Dr	Waterman Dr	Highway	4	6	Install a third through lane westbound from HQ Way to Operations Dr and an eastbound through lane from Oyster Point Rd Service Road to Waterman Dr for additional capacity and congestion relief.
2045-180	Newport News	Oyster Point Rd Widening Phase II	Warwick Blvd	Radcliff Ln	Highway	4	6	Install a third through lane westbound from Arboretum Way to Warwick Blvd and an eastbound through lane from Nettles Dr to Radcliff Ln for additional capacity and congestion relief.
2045-181	Newport News	Oyster Point Rd Widening Phase III	CSX Overpass	CSX Overpass	Highway	4	6	Install a third through lane eastbound and westbound across the CSX railroad overpass for additional capacity and to relieve congestion.
2045-182	Newport News	Patrick Henry Dr / Siemens Way Widening	Bland Blvd	Turnberry Blvd	Highway	2	4	Relieves congestion on parallel facility
2045-183	Newport News	Saunders Rd Widening	Harpersville Rd	Hampton CL	Highway	2	4	Widen Saunders Rd from Harpersville Rd to Hampton City Limits for additional capacity. This project will tie into the completed widening project in the City of Hampton.
2045-184	Newport News	Turnberry Blvd Extension	McManus Blvd	Ridgewood Pkwy	Highway	0	4	Install new roadway from McManus Blvd to Denbigh Blvd for congestion relief on parallel facility (Denbigh Blvd).
2045-186	Newport News	Warwick Blvd Widening Phase I	Nettles Dr	Oyster Point Rd	Highway	4	6	Install a third through lane northbound and southbound on Warwick Blvd from Nettles Dr to Oyster Point Rd for additional capacity and congestion relief.
2045-187	Newport News	Warwick Blvd Widening Phase II	Oyster Point Rd	Bland Blvd	Highway	4	6	Install a third through lane northbound and southbound on Warwick Blvd from Oyster Point Rd to Bland Blvd for additional capacity.
2045-188	Newport News	Warwick Blvd Widening Phase III	Bland Blvd	Beechmont Dr	Highway	4	6	Install a third through lane northbound and southbound on Warwick Blvd from Bland Blvd to Beechmont Dr for additional capacity and to relieve congestion.
2045-189	Newport News	Warwick Blvd Widening Phase IV	Beechmont Dr	Atkinson Way	Highway	4	6	Install a third through lane northbound and southbound on Warwick Blvd from Beechmont Dr to Atkinson Way for additional capacity.
2045-190	Newport News	Warwick Blvd Widening Phase V	Atkinson Way	Lees Mill Dr	Highway	4	6	Install a third through lane northbound and southbound on Warwick Blvd from Atkinson Way to Lees Mill Dr for additional capacity.
2045-191	Newport News	Warwick Blvd Widening Phase VI	Lees Mill Dr	Yorktown Rd	Highway	2	4	Install a second through lane northbound and southbound on Warwick Blvd from Lees Mill Dr to Yorktown Rd for additional capacity and to relieve congestion adjacent to Oakland Industrial Park during PM peak. Includes interchange work
2045-192	Norfolk	Ballentine Blvd	I-264	Virginia Beach Blvd	Highway	4	6	Widening from 4 to 6 lanes.
2045-193	Norfolk	Brambleton Ave	Midtown Tunnel	I-264	Highway	4/6	6/8	Corridor improvements to improve travel flow, pedestrian safety and comfort and landscaping

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2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-195	Norfolk	Little Creek Rd	Tidewater Dr	Shore Dr	Highway	4	6	Corridor improvements to improve travel flow, pedestrian safety and comfort and landscaping
2045-196	Norfolk	Monticello Ave	St Pauls Blvd	Virginia Beach Blvd	Highway	4	6	Widening from 4 to 6 lanes.
2045-197	Norfolk	Newtown Rd	I-264	Virginia Beach Blvd	Highway	4	6	Widening from 4 to 6 lanes.
2045-198	Norfolk	Tidewater Dr	City Hall Ave	Norview Ave	Highway	4	6	Widening from 4 to 6 lanes.
2045-199	Norfolk	Virginia Beach Blvd	Glenrock Rd	George St	Highway	4	6	Remove service lanes and convert into 6 lane section with improved intersections, pedestrian safety, lighting and landscaping.
2045-200	Portsmouth	Elm Ave Realignment Project	Victory Blvd (Rte 239)	G.W. Hwy (US 17)	Highway	2	4	Improve access to Norfolk Naval Shipyard including a widening of Elm Avenue between Rte 239 and US 17 from 2 to 4 lanes and intersection improvements at Navy Gates 29 and 36.
2045-201	Portsmouth	Harper Ave	Rte 164/US 58	Portsmouth Marine Terminal	Highway	2	3 or 4	Pavement restoration and expansion for the main access road to PMT.
2045-202	Smithfield	Battery Park Rd	S. Church St	Nike Park Rd	Highway	2	4	Widening.
2045-156	Smithfield	Benns Church Blvd	Turner Dr (Rte 644)	Church St S	Highway	4	6	Widening from 4 to 6 lanes.
2045-203	Smithfield	S. Church St	Battery Park Rd	Talbot Dr	Highway	2	3	Widening
2045-204	Suffolk	Bridge Rd (US 17)	Mills Godwin Bridge	Chesapeake CL	Highway	4	6	Provides widening from 4 to 6 lanes to address congestion
2045-205	Suffolk	Bridge Rd (US 17)	Mills Godwin Bridge	Isle of Wight CL	Highway	4	6	Provides widening from 4 to 6 lanes to address congestion
2045-206	Suffolk	Corridor Improvements - Suffolk	Northern Suffolk	Central/ Downtown Suffolk	Highway	2	4	An integrated set of projects creating a continuous four lane corridor primarily along existing routes (Wilroy Rd, Nansemond Pkwy, and Bennetts Pasture Rd) connecting Northern Suffolk to central/downtown Suffolk.
2045-207	Suffolk	Godwin Blvd	Suffolk Bypass	Kings Fork Rd	Highway	4	6	Provides widening from 4 to 6 lanes to address congestion.
2045-208	Suffolk	Godwin Blvd - Phase 1	Holly Hill Ln	Village of Chuckatuck	Highway	2	4	Widening from 2 to 4 lanes to address congestion.
2045-209	Suffolk	Nansemond Pkwy (Rte 337)	Shoulder's Hill Rd (Rte 626)	Wilroy Rd (Rte 642)	Highway	2	4	Provides widening from 2 to 4 lanes to address congestion
2045-23	Suffolk	Shoulders Hill Rd (Rte 626)	Nansemond Pkwy (Rte 337)	Bridge Rd (US 17)	Highway	2	4	Widening from 2 to 4 lanes to address congestion
2045-210	Suffolk	Suffolk/ US 58 Bypass	Terminus west of SPSA landfill/ HR Executive Airport	US 460 Interchange	Highway	4	6	Widening
2045-211	Suffolk	Whaleyville Blvd (US 13) - Phase 1	Village of Whaleyville	North Carolina Border	Highway	2	4	Corridor improvements to improve inter-state passenger and freight movements.

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2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-212	Suffolk	Whaleyville Blvd (US 13) - Phase 2	Carolina Rd (Rte 32)	Village of Whaleyville	Highway	2	4	Corridor improvements to improve inter-state passenger and freight movements.
2045-213	Suffolk	Wilroy Rd (Rte 642)	Nansemond Pkwy (Rte 337)	Constance Rd	Highway	2	4	Widening from 2 to 4 lanes to address congestion
2045-214	Suffolk	Wilroy Rd (Rte 642)	Suffolk Bypass	Nansemond Pkwy	Highway	2	4	Widening from 2 to 4 lanes to address congestion.
2045-215	Virginia Beach	Birdneck Road	I-264	Virginia Beach Blvd	Highway	4	6	Relieve congestion on parallel facilty
2045-216	Virginia Beach	Clearfield Ave	Virginia Beach Blvd	Cleveland St	Highway	2	4	Widening 2 lanes to 4 lanes
2045-217	Virginia Beach	Dam Neck Road - Phase I	Princess Anne Rd	Holland Rd	Highway	4	6	Widening
2045-218	Virginia Beach	Dam Neck Road - Phase II	Holland Rd	Drakesmile Rd	Highway	4	6	Relieve congestion on parallel facilty
2045-219	Virginia Beach	Dam Neck Road - Phase III	Drakesmile Rd	London Bridge Rd	Highway	4	6	Widening
2045-220	Virginia Beach	Drakesmile Extended - Phase I	Dam Neck Rd	Holland Rd	Highway	0	4	Relieve congestion on parallel facilty
2045-221	Virginia Beach	Drakesmile Extended - Phase II	Holland Rd	Princess Anne Rd	Highway	0	4	Relieve congestion on parallel facilty
2045-222	Virginia Beach	Ferrell Pkwy	Indian Lakes Blvd	Indian River Rd	Highway	4	6	Relieve congestion on parallel facilty
2045-223	Virginia Beach	Ferrell Pkwy	Indian Lakes Blvd	Pleasant Valley Rd	Highway	4	6	Relieve congestion on parallel facilty
2045-224	Virginia Beach	Ferrell Pkwy	Pleasant Valley Rd	Salem Rd	Highway	4	6	Widening from 4 lanes to 6 lanes.
2045-225	Virginia Beach	First Colonial Rd	Old Donation Pkwy	Laskin Rd	Highway	4	6	Relieve congestion on parallel facilty
2045-226	Virginia Beach	First Colonial Rd	Old Donation Pkwy	Great Neck Rd	Highway	4	6	Relieve congestion on parallel facilty
2045-227	Virginia Beach	General Booth Blvd - Phase II	Oceana Blvd	Dam Neck Rd	Highway	6	8	Relieve congestion on parallel facilty
2045-228	Virginia Beach	General Booth Blvd - Phase I	Birdneck Rd	Oceana Blvd	Highway	4	6	Relieve congestion on parallel facility
2045-229	Virginia Beach	General Booth Blvd Phase IV	London Bridge Rd	Nimmo Pkwy	Highway	4	6	Widening from 4 to 6 lanes.
2045-114	Virginia Beach	Greenbelt Segment - Phase I	London Bridge Rd	Princess Anne Rd.	Highway	0	4	New alignment to relieve congestion, provide new access.

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2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-114A	Virginia Beach	Greenbelt - Phase II	Princess Anne Rd	Chesapeake CL	Highway	0	4	New alignment to relieve congestion, provide new access.
2045-230	Virginia Beach	Holland Rd - Phase III	Rosemont Rd	Independence Blvd	Highway	4	6	Relieve congestion on parallel facilty
2045-231	Virginia Beach	Holland Road	Dam Neck Rd	Rosemont Rd	Highway	4	6	Widening from 4 lanes to 6 lanes.
2045-232	Virginia Beach	I-264 Preferred Alternative	Independence Blvd	Rosemont Rd	Highway	6/8	8/10	Widening of I-264 between Independence Blvd and Rosemont Rd that includes one additional travel lane in each direction and where HOV restrictions are in place, the shoulder lane is to be converted to a general purpose lane.
2045-233	Virginia Beach	Independence Blvd	Haygood Rd	Northampton Blvd	Highway	4	6	Widening from 4 lanes to 6 lanes.
2045-234	Virginia Beach	Independence Blvd	Pembroke Blvd	Virginia Beach Blvd	Highway	6	8	Widening from 6 lanes to 8 lanes.
2045-235	Virginia Beach	Indian River Rd	Centerville Tnpk	Ferrell Pkwy	Highway	6	8	Relieve congestion on parallel facilty
2045-236	Virginia Beach	Indian River Rd	Centerville Tnpk	I-64	Highway	8	10	Widening from 8 to 10 lanes.
2045-237	Virginia Beach	Indian River Rd	West Neck Rd	North Landing Rd	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-238	Virginia Beach	Indian River Road	Elbow Rd	North Landing Rd	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-239	Virginia Beach	Jeanne St	Constitution Dr	Independence Blvd	Highway	3	4	Widening from 3 lanes to 4 lanes.
2045-240	Virginia Beach	Landstown Rd - Phase I	Landstown Centre Way	Landstown Rd	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-241	Virginia Beach	Landstown Rd Extended - Phase II	Landstown Road	Nimmo Pkwy	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-242	Virginia Beach	Landstown Rd Extended - Phase III	Nimmo Pkwy	North Landing Rd	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-243	Virginia Beach	Landstown Rd Extended - Phase IV	North Landing Rd	Indian River Rd	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-244	Virginia Beach	Laskin Road - Phase IB	Laskin Rd Bridge	Oriole Dr	Highway	4	6	Relieve congestion on parallel facilty
2045-245	Virginia Beach	Laskin Road - Phase II	Oriole Dr	30th/31st St	Highway	4	6	Relieve congestion on parallel facilty
2045-246	Virginia Beach	Laskin Road - Phase III	Republic Rd	I-264	Highway	4	6	Widening from 4 to 6 lanes.
2045-247	Virginia Beach	London Bridge Road	Dam Neck Rd	Shipps Corner Rd	Highway	2	4	Relieve congestion on parallel facilty

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2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-248	Virginia Beach	Lynnhaven Pkwy	Holland Rd	Princess Anne Rd	Highway	4	6	Relieve congestion on parallel facilty
2045-250	Virginia Beach	Nimmo Pkwy - Phase II	West Neck Rd	Landstown Rd Extended	Highway	0	2	Relieve congestion on parallel facilty
2045-251	Virginia Beach	Nimmo Pkwy - Phase III	Landstown Rd Extended	Salem Rd	Highway	0	2	Relieve congestion on parallel facility
2045-252	Virginia Beach	Nimmo Pkwy - Phase VIIB	Albuquerque Rd	Sandbridge Rd - Nimmo VIIA	Highway	0	2	Relieve congestion on parallel facility
2045-253	Virginia Beach	North Great Neck	Virginia Beach Blvd	Wolfsnare Rd	Highway	4	6	Widening from 4 lanes to 6 lanes.
2045-254	Virginia Beach	North Lynnhaven Rd	Virginia Beach Blvd	Lynnhaven Pkwy	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-255	Virginia Beach	Princess Anne Commons Rd A	Landstown Centre Way	1200 feet east	Highway	0	2	New facility
2045-256	Virginia Beach	Princess Anne Road	Providence Rd	Salem Rd	Highway	4	6	Widening from 4 lanes to 6 lanes.
2045-257	Virginia Beach	Providence Road	Kempsville Rd	Princess Anne Rd	Highway	2	4	Relieve congestion on parallel facilty
2045-258	Virginia Beach	Rosemont Rd	Virginia Beach Blvd	Holland Rd	Highway	4	6	Relieve congestion on parallel facilty
2045-259	Virginia Beach	Rosemont Road - Phase V	Dam Neck Rd	Lynnhaven Pkwy	Highway	2	4	Widening
2045-260	Virginia Beach	Salem Road - Phase II	Elbow Rd	North Landing Rd	Highway	2	4	Relieve congestion on parallel facilty
2045-261	Virginia Beach	Salem Road	Independence Blvd	Elbow Rd	Highway	2	4	Widening from 2 lanes to 4 lanes.
2045-262	Virginia Beach	Shore Drive - Phase II	Pleasure House Road	Treasure Island Drive	Highway	4	6	Widening
2045-263	Virginia Beach	West Neck Rd	North Landing Rd	Indian River Rd	Highway	2	4	Widening
2045-264	Williamsburg	Monticello Ave	Richmond Rd (US 60)	Treyburn Dr	Highway	3	5	The Monticello Avenue improvements provide additional capacity and improved turning movements for a minor arterial in an existing commercial area with potential for redevelopment.
2045-265	York County	Commonwealth Dr Extension	G.W. Mem Hwy (U.S. 17)	Commonwealth Dr	Highway	0	4	New facility
2045-102	York County	Denbigh Blvd (Rte 173)	Independence Blvd	York CL	Highway	2	4	Widening
2045-266	York County	G.W. Mem Hwy (US 17)	Fort Eustis Blvd (Rte 105)	Coleman Bridge	Highway	4	6	Widening

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2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-267	York County	G.W. Mem Hwy (US 17)	Denbigh Blvd (Rte 173)	Fort Eustis Blvd (Rte 105)	Highway	4	6	Widening
2045-268	York County	J. Clyde Morris Blvd/G.W. Mem Hwy (US 17)	Newport News CL	1.27 mi South of Rte 620 (Lakeside Dr/ Oriana Rd)	Highway	4	6	Widening from 4 lanes to 6 lanes.
2045-301	Multi-jurisdictional	I-64/I-264 Interchange Phase IIIA	N/A	N/A	Interchange	N/A	N/A	Construct structures through interchange, bridges carrying EB I-64 over Kempsville Rd and Virginia Beach Blvd, and bridge carrying EB I-264 over Newtown Rd; widen EB I-64 by 1-2 lanes from Northampton Blvd entrance ramp; widening EB I-264 one lane to C/D merge with mainline.
2045-302	Multi-jurisdictional	I-64/I-264 Interchange Phase IIIB	N/A	N/A	Interchange	N/A	N/A	Widen I-264 EB outer C/D from Newtown Rd interchange to mainline merge point; widen I-264 EB to east of Witchduck Rd; reconfigure I-264 EB entrance ramp from Witchduck Rd. Widen I-264 EB exit ramps to provide additional lanes; modify signals at ramp terminal intersections along Newtown Rd. Replace bridge carrying I-264 over Witchduck Rd.
2045-303	Multi-jurisdictional	I-64/I-264 Interchange Phase IIIC	N/A	N/A	Interchange	N/A	N/A	Widen I-64 WB from north of Virginia Beach Blvd to Northampton Blvd Interchange; construct minor widening of bridges carrying I-64 WB over Northampton Blvd; north of exit ramp to Northampton Blvd, operate shoulder use lane along I-64 WB during AM peak only.
2045-304	Multi-jurisdictional	I-64/I-264 Interchange Phase IIID	N/A	N/A	Interchange	N/A	N/A	Construct ramp through interchange and merge lanes onto I-64 WB; realign entrance ramp from Military Hwy, widen I-264 EB C/D, and widen I-64 WB to three lanes approaching overpass of I-264 EB. Remove loop exit ramp from I-264 EB C/D to I-64 WB, and remove left exit from I-264 EB mainline.
2045-305	Multi-jurisdictional	I-64/I-264 Interchange Phase IIIE	N/A	N/A	Interchange	N/A	N/A	Construct I-264 WB/Newtown Interchange improvements; widen Newtown Rd from Greenwich Rd to north of Cleveland St; construct I-264 WB C/D roadway and oter ramp to I-64 EB/WB; widen I-64 WB to receive new ramp lanes. Widen I-64 WB shoulder north of entrance ramp from Northampton Blvd, operate shoulder use lane along I-64 WB during AM peak only.
2045-306	Multi-jurisdictional	I-64/I-264 Interchange Phase IIIF	N/A	N/A	Interchange	N/A	N/A	Construct ramp through interchange, over Nosehs Creek and Curlew Dr. Widen I-64 EB to provide one additional lane to Indian River Rd exit ramp; replace bridges carrying Providence Rd over I-64. Remove loop exit ramp from I-264 WB C/D roadway and left exit ramp from I-264 WB mainline.
2045-307	Multi-jurisdictional	US 58/258 Interchange	N/A	N/A	Interchange	N/A	N/A	Interchange improvements.
2045-308	Multi-jurisdictional	Bowers Hill Interchange	N/A	N/A	Interchange	N/A	N/A	Improvement to interchange.
2045-317	Multi-jurisdictional	HRBT - Phase 2 (I-564/I-64 Interchange Improvements)	N/A	N/A	Interchange	N/A	N/A	Bid Alternate of the HRBT - with direct access/entry to HOT Lanes.
2045-309	Chesapeake	I-64/I-464 Loop Ramp (I-64 to I-464 South)	N/A	N/A	Interchange	N/A	N/A	TBD
2045-310	Chesapeake	I-64/I-464/US 17 Interchange	N/A	N/A	Interchange	N/A	N/A	Improve I-64/I-464/US 17 interchange.
2045-311	Hampton	I-64 at Lasalle Ave	I-64 WB	Lasalle Ave	Interchange	N/A	N/A	Add movement from eastbound I-64 to northbound Lasalle Ave + adding for 2040 plan a grade separated movement from westbound I-64 to eastbound Armistead and northbound LaSalle
2045-312	Hampton	I-64 at N. King St	N/A	N/A	Interchange	N/A	N/A	Add full interchange at King Street; close EB existing off-ramp at Rip Rap Road
2045-313	Hampton	I-64 at Settlers Landing Rd	N/A	N/A	Interchange	N/A	N/A	Ramp Modifications for EB and WB
2045-314	Newport News	I-64/Denbigh Blvd Interchange Project	N/A	N/A	Interchange	N/A	N/A	Install a full interchange on I-64 at Denbigh Blvd to reduce congestion at the I-64 and Jefferson Ave interchange as well as congestion through the Jefferson Ave corridor from I-64 to Bland Blvd.
2045-315	Newport News	I-64/Fort Eustis Blvd Interchange	N/A	N/A	Interchange	N/A	N/A	Improve interchange at I-64 and Fort Eustis Blvd for additional capacity and congestion relief.

Hampton Roads 2045 Long-Range Transportation Plan Candidate Projects

2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-316	Norfolk	Air Terminal Interchange	N/A	N/A	Interchange	N/A	N/A	Construct new interchange.
2045-318	Norfolk	I-264 at Ballentine Blvd Diverging Diamond Interchange	N/A	N/A	Interchange	N/A	N/A	Interstate Interchange Reconstruction
2045-319	Norfolk	I-264/Military Hwy Interchange	N/A	N/A	Interchange	N/A	N/A	Interchange improvements.
2045-320	Norfolk	I-64/Northampton Blvd Interchange - EB Traffic from Northampton Blvd to I-264	N/A	N/A	Interchange	N/A	N/A	Provide improvements to I-64 EB On Ramp from Northampton Blvd.
2045-321	Norfolk	Military Hwy at I-64 -- New EB On-Ramp	N/A	N/A	Interchange	N/A	N/A	New I-64 Eastbound on-ramp.
2045-322	Portsmouth	Cedar Ln and VA-164 Interchange	Cedar Ln	VA-164	Interchange	N/A	N/A	Companion project to the Craney Island Access Road Study.
2045-323	Portsmouth	Frederick Blvd and I-264 Interchange	Frederick Blvd	I-264 Ramps	Interchange	N/A	N/A	Interchange improvements.
2045-324	Portsmouth	Victory Blvd and I-264 Interchange	Victory Blvd (Rte 239)	I-264 Ramps	Interchange	N/A	N/A	Interchange improvements.
2045-325	Portsmouth	VIG Interchange	N/A	N/A	Interchange	N/A	N/A	Interchange improvements.
2045-326	Virginia Beach	I-264 at Independence Blvd	N/A	N/A	Interchange	N/A	N/A	Safety improvements, Relieve congestion
2045-327	Virginia Beach	I-264 at Rosemont Rd	N/A	N/A	Interchange	N/A	N/A	Safety improvements, Relieve congestion
2045-328	York County	Merging/Diverging Lane Improvements at I-64 W and Route 199 (Exit 242)	N/A	N/A	Interchange	N/A	N/A	Improve merging/diverging lane. Current lane configuration is short and hazardous.
2045-501	Multi-jurisdictional	Enhanced Bus Service/Bus Replacement - HRT	N/A	N/A	Transit	N/A	N/A	HRT enhanced bus service/bus replacement.
2045-502	Multi-jurisdictional	Enhanced Bus Service/Bus Replacement - WATA	N/A	N/A	Transit	N/A	N/A	WATA enhanced bus service/bus replacement.
2045-503	Multi-jurisdictional	Expand the Tide Light Rail Across Hampton Roads	Existing Service Locations	Various Locations	Transit	N/A	N/A	Exand the Tide Light Rail all over Hampton Roads (e.g. Virginia Beach to Chespeake to Norfolk).
2045-504	Multi-jurisdictional	Ferry Service	Norfolk	Hampton	Transit	N/A	N/A	New ferry service.
2045-505	Multi-jurisdictional	Ferry Service	Old Towne (Portsmouth)	Downtown Norfolk - Naval Station Norfolk	Transit	N/A	N/A	New ferry service.
2045-506	Multi-jurisdictional	High-Speed and Intercity Passenger Rail - DRPT Tier I EIS ROD - Preferred Alternative	Hampton Roads	Richmond / Northeast Corridor	Transit	N/A	N/A	High-speed and Intercity passenger rail.
2045-507	Multi-jurisdictional	High-Speed and Intercity Passenger Rail - HRTPO High Speed Rail Vision Plan - Option 4 Richmond Direct Improved	Hampton Roads	Richmond / Northeast Corridor	Transit	N/A	N/A	High-speed and Intercity passenger rail.

Hampton Roads 2045 Long-Range Transportation Plan Candidate Projects

2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-508	Multi-jurisdictional	High-speed water taxis system	N/A	N/A	Transit	N/A	N/A	High speed 50+ passenger water taxi Lynnhaven to NAS to downtown Norfolk to downtown Hampton to Bennett Creek.
2045-509	Multi-jurisdictional	Peninsula Commuter Rail	Newport News	Williamsburg	Transit	N/A	N/A	Provide commuter rail on the Peninsula.
2045-510	Multi-jurisdictional	Peninsula High Capacity Transit	Hampton/ Newport News	Hampton/ Newport News	Transit	N/A	N/A	Add Bus Rapid Transit alignment on the Peninsula.
2045-511	Multi-jurisdictional	Peninsula High Capacity Transit Extension	Peninsula	Southside	Transit	N/A	N/A	Add Bus Rapid Transit alignment that connects the Peninsula to the Southside
2045-512	Multi-jurisdictional	Provide Passenger Rail	N/A	N/A	Transit	N/A	N/A	Provide passenger rail. Link it to the Virginia Railway Express system, as well as service to North Carolina and Emporia.
2045-513	Multi-jurisdictional	Southside Ferry Service	Existing Service Locations	Various Locations	Transit	N/A	N/A	Provide ferry service to all of Southside - Norfolk, Chesapeake, Portsmouth, VA Beach
2045-514	Multi-jurisdictional	Tide Light Rail Expansion - Hampton Veterans Center	Existing Tide Light Rail Line	Hampton Veterans Center	Transit	N/A	N/A	Expand the Tide Light Rail to the Hampton Veterans Center.
2045-515	Multi-jurisdictional	Tide Light Rail Expansion - Williamsburg to Hampton/ VA Beach	Williamsburg	Hampton/ VA Beach	Transit	N/A	N/A	Provide Tide to the Peninsula and connect to Southside.
2045-516	Chesapeake	High Capacity Transit Extension to Greenbrier Area	South Norfolk	Greenbrier Area	Transit	N/A	N/A	Fixed Guideway/LRT.
2045-517	Norfolk	Elizabeth River Ferry Expansion	Current Service Location	ODU and Naval Station Norfolk	Transit	N/A	N/A	Expand ferry services to Old Dominion University and Naval Station Norfolk.
2045-518	Norfolk	Naval Station Norfolk Transit Extension	Existing LRT	Naval Station Norfolk	Transit	N/A	N/A	Fixed Guideway/LRT/High Capacity.
2045-519	Suffolk	Tide Light Rail Expansion - Suffolk	Existing Service Locations	Suffolk	Transit	N/A	N/A	Extend the Tide Light Rail to Suffolk.
2045-601	Multi-jurisdictional	VA-164 Extension	VA-164	Suffolk Bypass	Intermodal	0	2	Extend VA-164 on existing RR Right of Way
2045-602	Chesapeake	Portlock Rd Railroad Overpass	N/A	N/A	Intermodal	2	2	Construction of new structure to replace at grade crossing along Portlock Rd between Varsity Dr and Reid St.
2045-603	Norfolk	Hampton Blvd at Terminal Blvd	Trouville Ave/Portor St	Hampton Blvd	Intermodal	N/A	N/A	New highway/ rail underpass.
2045-604	Portsmouth	Craney Island Access Rd	VA 164 and Median Rail	Craney Island Marine Terminal with Interchange and Connection to Elizabeth River Crossing	Intermodal	0	2	Provides access to Craney Island Port Facility.
2045-605	Suffolk	Finney Ave Flyover	Pinner St	Route 13/337 E Washington St	Intermodal	N/A	N/A	Construct grade separated crossing of existing railroad in core Suffolk downtown area.
2045-606	Suffolk	Nansemond Pkwy (Rte 337)	N/A	N/A	Intermodal	N/A	N/A	Highway-rail grade separation near Suffolk Meadows Blvd.
2045-607	Suffolk	North Suffolk Connector Rd	Nansemond Pkwy	I-664	Intermodal	0	2	New 2-lane divided roadway.

Hampton Roads 2045 Long-Range Transportation Plan Candidate Projects

2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-701	Multi-jurisdictional	Bike Lanes on Indian River Rd	Berkley Ave	Sparrow Rd	Active Transportation	N/A	N/A	Add bike lanes on Indian River Rd from Berkley Ave in Norfolk to Sparrow Rd in Chesapeake.
2045-702	Multi-jurisdictional	Bike Lanes on Indian River Rd	Campostella Rd	Military Hwy	Active Transportation	N/A	N/A	Add bike lanes on Indian River Rd between Campostella Rd and Military Hwy including lowering speed limits and traffic calming.
2045-703	Multi-jurisdictional	Bike Path Along Shore Dr/Hampton Blvd/Little Creek Rd	Norfolk Elizabeth River Trail	Virginia Beach City Line	Active Transportation	N/A	N/A	Bike Lanes
2045-704	Multi-jurisdictional	Birthplace of America Trail	Virginia Capital Trail	Hampton Roads	Active Transportation	N/A	N/A	Build the Birthplace of America Trail.
2045-707	Multi-jurisdictional	South Hampton Roads Trail: Complete Trail (Suffolk to VB)	Suffolk	Virginia Beach	Active Transportation	N/A	N/A	Bicycle / Pedestrian Facility
2045-708	Multi-jurisdictional	South Hampton Roads Trail: Virginia Beach (Bike Trails/Lanes Along Light Rail Tracks)	Norfolk	Oceanfront	Active Transportation	N/A	N/A	Bicycle / Pedestrian Facility
2045-709	Multi-jurisdictional	Southside Bike Trail	Chesapeake	Virginia Beach Oceanfront	Active Transportation	N/A	N/A	Provide Southside Bike Trail corridor from Chesapeake to Virginia Beach oceanfront
2045-711	Multi-jurisdictional	VA/NC Dismal Swamp Bike/Walk Trail Connection	VA	NC	Active Transportation	N/A	N/A	Bicycle / Pedestrian Facility
2045-712	Chesapeake	Battlefield Blvd	Military Hwy	Volvo Pkwy	Active Transportation	N/A	N/A	Provide bicycle and pedestrian accomodations for safer travel to shopping/retail on foot.
2045-713	Chesapeake	Bike lane along Great Bridge Blvd	Battlefield Blvd	Bainbridge Blvd	Active Transportation	N/A	N/A	Construction of in-street bike lanes from Battlefield Blvd to Bainbridge Blvd.
2045-714	Chesapeake	Bike lane on Waters Rd	Cedar Rd	Washington Dr	Active Transportation	N/A	N/A	Construction of in-street bike lanes from Cedar Rd to Washington Dr.
2045-715	Chesapeake	Construct multi-use path along Etheridge Manor Blvd/ Hanbury Rd	Centerville Tnpk	Johnstown Rd	Active Transportation	N/A	N/A	Construct new multi-use path.
2045-716	Chesapeake	Construct multi-use path along George Washington Hwy	Moses Grandy Trail	Deep Creek Park Trailhead	Active Transportation	N/A	N/A	Multi-use path along George Washington Hwy from Moses Grandy Trail to connect to existing trail facility at Deep Creek Park.
2045-717	Chesapeake	Construct multi-use path along Greenbrier Pkwy	Eden Way	Kempsville Rd	Active Transportation	N/A	N/A	Multi-use path along Greenbrier Pkwy from Eden Way to Kempsville Rd.
2045-718	Chesapeake	Construct multi-use path along Shell Rd/Canal Rd	G.W. Hwy (US 17)	Military Hwy	Active Transportation	N/A	N/A	Multi-use path from G.W. Hwy (US 17) to Military Hwy along Shell Rd/Canal Rd.
2045-719	Chesapeake	Construct multi-use path trail along Dismal Swamp Canal	Existing Trailhead	North Carolina Border	Active Transportation	N/A	N/A	Multi-use path connecting from existing Dismal Swamp Canal trailhead to NC border.
2045-720	Chesapeake	South Hampton Roads Trail: Western Branch Phase 1	Taylor Rd	Poplar Hill Rd	Active Transportation	N/A	N/A	Convert the Commonwealth Railroad right-of-way to a shared use path
2045-721	Chesapeake	South Hampton Roads Trail: Western Branch Phase 2	Taylor Rd	Suffolk CL	Active Transportation	N/A	N/A	Construction of multi-use path from end of Western Branch Phase 1 at Taylor Rd to Suffolk CL.
2045-722	Gloucester	Hickory Fork Rd	Aberdeen Creek Rd (Rte 632)	Old Pinetta (Rte 610)	Active Transportation	2	2	The county would like to continue the improvements to Hickory Fork Rd. This roadway now provides access to two regional parks (one state park (in two locations) and one national). The current road is narrow and does not provide adequate access management (turn lanes in both directions). We would also like to see active transportation between the parks along or adjacent to this road.

Hampton Roads 2045 Long-Range Transportation Plan Candidate Projects

2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-723	Gloucester	Multi-use paths	Beaverdam Park	Main St	Active Transportation	N/A	N/A	Provide bike and pedestrian trails to Beaverdam Park from Main St in Gloucester.
2045-724	Hampton	Five Mile Loop Trail	Fort Monroe	Fort Monroe	Active Transportation	N/A	N/A	Develop Five Mile Loop Trail at Fort Monroe.
2045-725	James City County	Bike Lanes on Centerville Rd that connect to Capital Trail	Jamestown Rd (Rte 31)	John Tyler Hwy (Rte 5)	Active Transportation	N/A	N/A	Bike Lanes
2045-726	James City County	Monticello Ave Bike Lane	News Rd	Centerville Rd	Active Transportation	N/A	N/A	Provide 4-foot wide bike lane on both sides
2045-727	Newport News	16th St Revitalization	Marshall Ave	Peterson's Yacht Basin	Active Transportation	2	2	Install street upgrade that will provide full multi-modal facilities on 16th Street from Marshall Ave to Peterson's Yacht Basin.
2045-728	Newport News	Multi-use path on 25th St	Jefferson Ave	Parish Ave	Active Transportation	2	1	Install a road diet on 25th St from Jefferson Ave to Parish Ave to enhance other modes of travel.
2045-729	Newport News	Multi-use path on 26th St	Jefferson Ave	Parish Ave	Active Transportation	2	1	Install a road diet on 26th St from Jefferson Ave to Parish Ave to enhance other modes of travel.
2045-730	Newport News	Multi-use path on 27th St	Jefferson Ave	Parish Ave	Active Transportation	2	1	Install a road diet on 27th St from Jefferson Ave to Parish Ave to enhance other modes of travel.
2045-731	Newport News	Multi-use path on 28th St	Jefferson Ave	Parish Ave	Active Transportation	2	1	Install a road diet on 28th St from Jefferson Ave to Parish Ave to enhance other modes of travel.
2045-732	Norfolk	Bike Lanes on Granby St	W Ocean View Ave	W Main St	Active Transportation	N/A	N/A	Provide bike lanes along the length of Granby St.
2045-733	Norfolk	Bike/ pedestrian Access to Naval Station Norfolk via Hampton Blvd	Various Locations	Naval Station Norfolk	Active Transportation	N/A	N/A	Bike/pedestrian access to Naval Station Norfolk via Hampton Blvd
2045-734	Norfolk	Elizabeth River Trail Extension to Naval Station Norfolk	Cloncurry Road	Admiral Tausig Boulevard	Active Transportation	N/A	N/A	Extension of Existing Pedestrian/Bicycle Trail with a bike lane on Hampton Boulevard to NNS.
2045-735	Norfolk	Military Hwy Bike Access	N/A	Shopping Areas and Outlet Mall	Active Transportation	N/A	N/A	Provide bike access to shopping areas and outlet mall on Military Hwy.
2045-736	Poquoson	Bike Path on Hunts Neck Rd (Rte 172)	Yorktown Rd	Pasture Rd	Active Transportation	N/A	N/A	Provide 10' Shared Use Path
2045-737	Portsmouth	Bike lanes on Churchland Blvd	Portsmouth Trail	High St	Active Transportation	N/A	N/A	Provide bike facility connection
2045-738	Portsmouth	Complete High St	Chesnut St	MLK Overpass	Active Transportation	4	4	The "Complete Streets" conversion of High St to better accommodate bicyclist, pedestrians, and transit users as part of the South Hampton Roads Trail.
2045-739	Portsmouth	Portsmouth Rail-to-Trail	TBD	TBD	Active Transportation	N/A	N/A	Shared Use Path
2045-740	Portsmouth	Twin Pines Rd Shared Use Path	Swannanoa Dr	Sunset Point	Active Transportation	2	2	Install shared use path.
2045-741	Suffolk	Rail-to-Trail (Suffolk Seabord Coastline Trail, part of the South Hampton Roads Trail)	Pughsville Rd	Downtown Suffolk	Active Transportation	N/A	N/A	Shared Use Path

Hampton Roads 2045 Long-Range Transportation Plan Candidate Projects

2045 ID	Locality	Project Name	From	To	Category	Existing Lanes	Proposed Lanes	Project Description
2045-742	Virginia Beach	Greenwich Rd conversion to Shared Use Path	Newtown Rd	South Witchduck Rd	Active Transportation	N/A	N/A	New facility
2045-743	Virginia Beach	Level Green Powerline Corridor	Reon Dr	Chesapeake CL at S. Military Hwy	Active Transportation	N/A	N/A	New facility - Shared Use Path
2045-744	Virginia Beach	Nimmo Trail	Nimmo Pkwy	Sandbridge Rd	Active Transportation	N/A	N/A	New facility - Shared Use Path
2045-745	Virginia Beach	Northampton Blvd Right-of-Way	Bayside Dr	Greenwell Rd	Active Transportation	N/A	N/A	New facility - Shared Use Path
2045-746	Virginia Beach	Scarborough Bridge	Magic Hollow Blvd	Old Clubhouse Rd	Active Transportation	N/A	N/A	New facility - Shared Use Path
2045-747	Virginia Beach	Seaboard Rd Shared Use Path and land acquisition	North - Princess Anne Rd	South - Princess Anne Rd	Active Transportation	N/A	N/A	New facility
2045-748	Virginia Beach	Thalia Creek Greenway - Phase IV	Constitution Dr	Virginia Beach Trail	Active Transportation	N/A	N/A	TBD
2045-749	Virginia Beach	Thalia Creek Greenway - Phase V	Virginia Beach Trail	Virginia Beach Blvd	Active Transportation	N/A	N/A	TBD
2045-750	Virginia Beach	Thalia Creek Greenway - Phase VI	Constitution Dr	I-264	Active Transportation	N/A	N/A	TBD
2045-751	Virginia Beach	Virginia Beach Trail	Newtown Rd	Norfolk Ave	Active Transportation	N/A	N/A	Construct shared use path.
2045-752	Virginia Beach	Walkway at Virginia Beach Town Center Over I-264	Thalia Creek Greenway	Mt. Trashmore Park	Active Transportation	N/A	N/A	New facility - 14'-20' wide shared use path bridge
2045-753	Williamsburg	Carter's Grove Country Rd Shared Use Path	South England St	Ron Springs Dr	Active Transportation	N/A	N/A	Conversion to a shared use multi jurisdictional path in former private road
2045-754	Williamsburg	Monticello Ave Shared-Use Path	Treyburn Drive	Ironbound Rd (Rte 615)	Active Transportation	N/A	N/A	This project is a 10' lighted shared-use path along Monticello Avenue between Treyburn Drive and Ironbound Road that will improve access and safety for pedestrians and cyclists.
2045-755	Williamsburg	Strawberry Plains Rd Shared Use Path	Ironbound Rd	John Tyler Ln	Active Transportation	N/A	N/A	10 foot wide separated multi-use path on the eastern side of Strawberry Plains Rd
2045-756	York County	Penniman Rd (Sidewalk / Multi Use Path)	Williamsburg CL	Marquis Center Pkwy (Rte 199)	Active Transportation	N/A	N/A	Sidewalk & Multi-Use Path
2045-757	York County	Shared Use Path - Yorktown Road	Tabb High School	Hampton Hwy (Rte 134) at Brick Kiln Creek Bridge	Active Transportation	N/A	N/A	Shared Use Path
2045-758	York County	Shared Use Path Along Yorktown Rd	Cardinal Ln (Rte 670)	Victory Blvd (Rte 171)	Active Transportation	N/A	N/A	Shared Use Path
2045-759	York County	Victory Boulevard Shared Use Path	Big Bethel Rd (Rte 600)	Carys Chapel Rd (Rte 762)	Active Transportation	2	2	10-foot shared use path on the north side of Victory Blvd (Rte 171)

Dale Stith

From: Dale Stith
Sent: Thursday, May 14, 2020 12:54 PM
To: 'Eberle, Mark D'
Cc: 'Dance, Eola L'; 'Maver, Jennifer R'
Subject: RE: Hampton Roads Transportation Planning Organization - Long Range Transportation Plan Letter and Draft Mitigation Table

Good Afternoon Mark,

Thank you for reviewing the draft environmental mitigation discussion and table associated with our 2045 Long-Range Transportation Plan (LRTP) update, and also for coordinating this review with the Colonial Historic National Park. As requested, I will make sure you're listed as the NPS point of contact.

In the next few weeks, we will be posting a couple of 2045 LRTP draft reports on candidate projects being evaluated for the plan for review and comment. I'll be sure to forward links to these draft reports once they're posted.

Thanks again for your feedback.

Dale

Dale M. Stith, AICP, GISP
Principal Transportation Planner
Hampton Roads Transportation Planning Organization
The Regional Building | 723 Woodlake Drive | Chesapeake, VA 23320
dstith@hrtpo.org | www.hrtpo.org | Phone: 757.420.8300 | Fax: 757.523.4881

From: Eberle, Mark D
Sent: Wednesday, May 6, 2020 3:26 PM
To: dstith@hrtpo.org <dstith@hrtpo.org>
Cc: Dance, Eola L <Eola_Dance@nps.gov>; Maver, Jennifer R <Jennifer_Maver@nps.gov>
Subject: Hampton Roads Transportation Planning Organization - Long Range Transportation Plan Letter and Draft Mitigation Table

Hi Dale,
Thanks for coordinating this information with the National Park Service (NPS). I reviewed the Region's 2045 fiscally-constrained Long Range Transportation Plan letter and draft mitigation table. I have also coordinated this information with Colonial National Historic Park. At this point in time, we have no comments on the letter or draft mitigation table.
Please keep me as the NPS point of contact for this study as it progresses and new information becomes available. I will then share that information with the NPS team.

Thanks,
Mark

Mark Eberle
Resource Planning Specialist / External Review Coordinator
National Park Service

Interior Region 1, North Atlantic-Appalachian

1234 Market Street, 20th Floor, Philadelphia, PA 19107

Phone: 215-597-1258 Mobile: 267-315-1631

APPENDIX B

Appendix B contains the public notice that was posted on September 4, 2020 asking interested parties to review and comment on the draft *Hampton Roads 2045 Long-Range Transportation Plan: Transportation Challenges and Strategies* Report. No public comments were received.

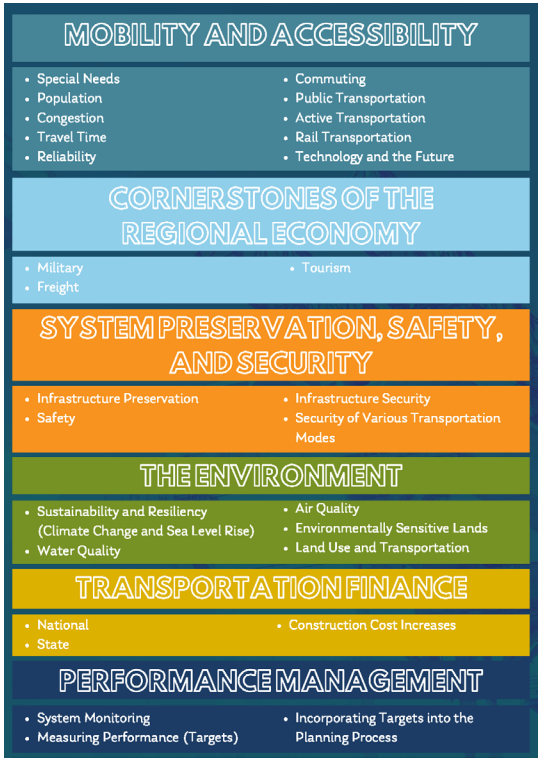
Appendix B also includes technical comments received by TTAC/LRTP Subcommittee Members. Comments were addressed in the report as appropriate.

PUBLIC NOTICE
2045 Long-Range Transportation Plan: Transportation Challenges and Strategies Draft Report

A core function of the HRTPO, the metropolitan planning organization (MPO) for the Hampton Roads area, is to develop and maintain a Long-Range Transportation Plan (LRTP). The LRTP is a blueprint for planned improvements to the Hampton Roads transportation system over a 20-year planning horizon based on the vision and goals of the region. Since 2016, HRTPO staff has been coordinating with regional stakeholders to update the LRTP to the horizon year of 2045.

HRTPO staff has developed the ***Hampton Roads 2045 Long Range Transportation Plan: Transportation Challenges and Strategies*** report, the fourth in the series of reports documenting the development of the 2045 LRTP. This draft report summarizes challenges related to the transportation system and strategies that are planned or in place to help address these challenges.

This report is intended to serve as a resource document and is organized into six categories. **Mobility and Accessibility** addresses the challenges and strategies related to traveling from point A to point B. **Cornerstones of the Regional Economy** discusses issues facing the military, the movement of freight, and tourism. **System Preservation, Safety, and Security** details the condition and preservation of transportation infrastructure, including the protection of residents and visitors to the region. The **Environment** chapter explores topics such as maintaining water and air quality, protecting sensitive areas, and adjusting to the impacts of climate change. **Transportation Finance** details issues related to funding transportation needs. **Performance Management** highlights efforts to monitor and measure system performance.



CLICK HERE to review the draft report.

All interested parties are encouraged to review the draft report and send comments to Leonardo Pineda, Transportation Planner II, at lpineda@hrtpo.org or by mail to 723 Woodlake Drive, Chesapeake, Virginia 23320 by **September 18, 2020.**

Leo Pineda

From: Leo Pineda
Sent: Thursday, September 10, 2020 1:34 PM
To: 'Keenan, Lynne'
Subject: RE: Hampton Roads 2045 Long Range Transportation Plan: Transportation Challenges and Strategies

Lynne,

Thank you for the comments and compliments! We appreciate you taking the time to go through the report. We're in the process of reviewing them and will circle back with you if we have any questions.

Thanks again,
Leo

From: Keenan, Lynne <lynne.keenan@hampton.gov>
Sent: Friday, September 4, 2020 2:54 PM
To: Leo Pineda <lpineda@hrtpo.org>
Subject: RE: Hampton Roads 2045 Long Range Transportation Plan: Transportation Challenges and Strategies

Leo,

This plan is incredibly thorough and very well put together! There was a great deal of helpful information and it is useful for the transportation community but also the general public, so please pass along my sincere kudos to the HRTPO staff for their efforts!

Just two quick comments on the 2045 LRTP from me:

1. Pg 43 – Study references a 2020 Business Insider article but I think it needs a bit more explanation. The concept of the "regional backbone" is only briefly explained and then the article notes two backbones as options. Consider re-phrasing or expanding upon the explanation a bit further. This section reads confusingly.
2. Pg 61 – The number of active duty personnel do not make up the entirety of military populations. Can you get numbers for civilians and contractor personnel to help expand upon the impact of the military community within the region? 150,000, while a large number, is not nearly the impact when you add those additional personnel into the total, which puts additional strain on the traffic patterns. VA Military Affairs Council (VMAC) may have those numbers calculated regionally or Mike Coleman with the Sec of Veterans and Defense Affairs. (Forgive me, I worked for the navy as a planner for many years and this was a big topic of study, so I'm a bit more sensitive to this than most!)

Enjoy the long weekend!

From: Dale Stith
Sent: Monday, September 14, 2020 6:28 PM
To: 'Aaron Small' <ASmall@williamsburgva.gov>
Cc: Carolyn Murphy <cmurphy@williamsburgva.gov>
Subject: RE: Hampton Roads 2045 Long Range Transportation Plan: Transportation Challenges and Strategies

Hi Aaron,

Thank you for reviewing the draft 2045 LRTP Transportation Challenges and Strategies report and providing the comment below. We will also include this project as another great example of efforts to improve active transportation in our region.

Thanks,
Dale

Dale M. Stith, AICP, GISP
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From: Aaron Small <ASmall@williamsburgva.gov>
Sent: Monday, September 14, 2020 2:07 PM
To: Dale Stith <dstith@hrtpo.org>
Cc: Carolyn Murphy <cmurphy@williamsburgva.gov>
Subject: RE: Hampton Roads 2045 Long Range Transportation Plan: Transportation Challenges and Strategies

Dale,

On page 48 last paragraph, we also have a two-way protected bike lane. It is on Monticello Ave and will go fully active (with green paint) in the next couple weeks.

The rest of the report looks good (for the relatively quick scan I did). Great job.

Aaron

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From: Dale Stith
Sent: Wednesday, September 16, 2020 11:57 AM
To: 'Voigt, Christopher' <christopher.voigt@vdot.virginia.gov>
Cc: Jim Ponticello <Jim.Ponticello@vdot.virginia.gov>
Subject: RE: Hampton Roads 2045 Long Range Transportation Plan: Transportation Challenges and Strategies

Hi Chris,

Thanks for providing these comments. I'll revise this section and then run it by you to review.

Thanks,
Dale

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From: Voigt, Christopher <christopher.voigt@vdot.virginia.gov>
Sent: Wednesday, September 16, 2020 11:08 AM
To: Dale Stith <dstith@hrtpo.org>
Cc: Jim Ponticello <Jim.Ponticello@vdot.virginia.gov>
Subject: Fwd: Hampton Roads 2045 Long Range Transportation Plan: Transportation Challenges and Strategies

Hi Dale - Attached is a markup for the air quality section. I checked with Jim and we both agree the climate change section also needs to be updated but we will defer to you on that. FHWA may be able to provide guidance.

Any questions let me know.

Chris.

Christopher Voigt | VDOT Air Quality | (804) 371-6764